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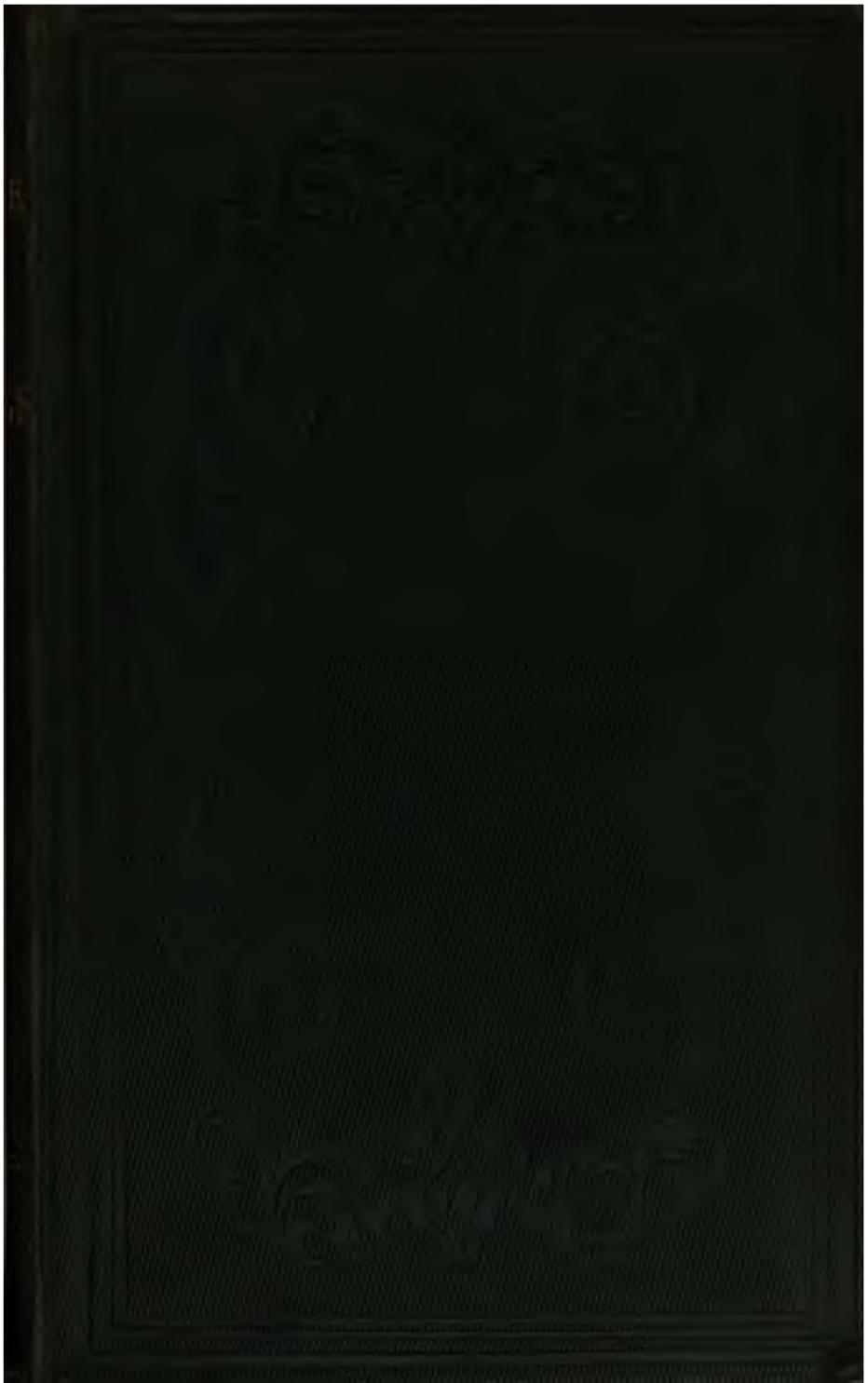
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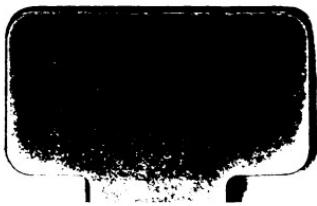
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WVC

# FEN SKETCHES:

BEING

A DESCRIPTION OF THE ALLUVIAL DISTRICT

KNOWN AS

## The Great Level of the Fens,

WITH

A BRIEF HISTORY OF ITS PROGRESSIVE  
IMPROVEMENTS IN

## DRAINAGE AND AGRICULTURE,

BY

JOHN ALGERNON CLARKE,

AUTHOR OF THE "PRIZE REPORT ON THE GREAT LEVEL OF  
THE FENS," IN THE JOURNAL OF THE ROYAL AGRICUL-  
TURAL SOCIETY OF ENGLAND.

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"This country,...is accounted (saith Bertius,) not without good reason, to be the gift of the ocean...For it is evident to all that sail in the ports of these flat countries that, at full sea, the fields within the banks, wherein cattle are depasturing and corn growing, do lie below the level of the ocean; which is to many no small astonishment."—Account of *Holland*, in Dugdale's "Imbanking and Draining."

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## P R E F A C E .

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THE substance of this little volume originally appeared in the form of Communications to the *Wisbech Advertiser* newspaper, and now responsive to the invitation of its readers, issues forth in the more pretentious character of a Book.

The gist of the information conveyed in these pages will be at once discovered by a glance at the table of contents. Our endeavour has been to give a concise though very incomplete history of the Fen land, with all the greater changes which have transpired upon its surface to make it what it is. And we believe that a work of this kind, adapted to the railway traveller and the public at large, has been long required. Passing through a mountain district, or a country of hill and vale, the stranger needs no hand-book to bid him understand and admire the beauties around him ; but in the Fen Level, destitute of scenic charms, he is surprised by the peculiarity of the scene, and enquiry and conjecture are excited by the perfect flatness of the soil, the strangely formed rivers, great drainage works, and generally artificial aspect of the country ;—he knows that the mountains and valleys retain the form which Nature gave them, but perceives that the Fens must have been reclaimed and preserved by the skill and patience of many generations of men. To explain the origin of the natural objects here attracting his attention, and narrate the varied history of the Drainage-works, is the purpose of these sketches. If any one ask, therefore, why Outlines so feeble and it may be inelegant in execution are displayed before the public eye, all we have to say is, that, to be inspected with proper advantage, our Sketches, like other people's, must be viewed from the *point of sight* ; and in this instance that point is situated upon the *horizontal line* of the Fens themselves. If the reader be at all curious with respect to this district, we think he may be entertained and instructed by our labours ; if he is not, then, by not looking from the only proper point of view, even our most faithful delineations may appear to him untrue, distorted, or miscoloured.

I. A. C.

LONG SUTTON, February, 1852.

## SUBJECTS :

	PAGE
<b>OUTLINE THE FIRST.</b>	
Geological changes.—Strata of the District.—Origin of the Fens .....	1
<b>OUTLINE THE SECOND.</b>	
Topographical view .....	12
<b>OUTLINE THE THIRD.</b>	
Classification of the Alluvial deposits .....	19
<b>OUTLINE THE FOURTH.</b>	
Hypotheses concerning the fen alluvials.—Roman remains.—The Great Level as a forest.—Subsidence.	33
<b>OUTLINE THE FIFTH.</b>	
The Great Level during the time of the Saxons.— Fruitfulness of the Fen islands.—Improvements effect- ed by the Monks .....	46
<b>OUTLINE THE SIXTH.</b>	
Early changes in the courses of the rivers.—Agricul- tural condition of the Fens prior to the General Drainage in the Seventeenth century .....	61
<b>OUTLINE THE SEVENTH.</b>	
Attempted projects.—Objections and replies.....	76
<b>OUTLINE THE EIGHTH.</b>	
General drainage.—Bedford Level.—Lincolnshire Fens. —Obstreperous behaviour of the fenmen .....	100
<b>OUTLINE THE NINTH.</b>	
A Rural retrospect.—Agricultural condition of the fens after the General Draining .....	124
<b>OUTLINE THE TENTH.</b>	
Beginning of Mill-drainage.—Improvement of the Witham.—State of the South Lincolnshire fens.— Perambulatory view of the disasters of Bedford Level in the Eighteenth century.—Eau-Brink Cut .....	150
<b>OUTLINE THE ELEVENTH.</b>	
Supernumerary sketch of the progress of Agricultural Science, with a Plea for Agricultural Literature .....	176
<b>OUTLINE THE TWELFTH.</b>	
Digression concerning Sheep and Cattle.....	198
<b>OUTLINE THE THIRTEENTH.</b>	
Fen-farming fifty years ago .....	209
<b>OUTLINE THE FOURTEENTH.</b>	
Outfall improvements.—Enclosures from the Wash.— Draining by Steam .....	235
<b>OUTLINE THE FIFTEENTH.</b>	
Modern Husbandry of the Fens.—A Conclusion.....	250

## FEN SKETCHES.

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### OUTLINE THE FIRST.

GEOLOGICAL CHANGES—STRATA OF THE DISTRICT—ORIGIN  
OF THE FENS.

UNDER the term “Great Level of the Fens,” we include the whole expanse of horizontal country which occupies the south-eastern quarter of Lincolnshire, the northern half of Cambridgeshire, and spreads itself also into the counties of Norfolk, Suffolk, Huntingdon, and Northampton, extending from Lincoln, Tattershall, and Wainfleet north, to Earith, Waterbeach, and Brandon south: having a length of about 70 miles, and a breadth of from 3 or 4 to 30 or 40 miles. The area of this district is more than 1060 square miles, or 680,000 acres; appearing on the map like an enlargement of the Wash, and in reality having the aspect of a sea of land lying

between that bay and the high lands in each of the above-named counties which seem to form an irregular coast line around it. To many readers, this Great Level will appear a remarkably *flat* subject; but nevertheless it is one of considerable interest,—to the natives of the low region because it is their home, and to the inhabitants of the uplands because its very flatness is a striking peculiarity. Dwelling in a plain whose boundary is beyond the reach of vision to the east (the sea appearing only like an extension of this tract,) and rises but tamely on the west in the form of low hills, the fenman is apt to regard an undulating landscape as an exception to the general aspect of our land; whereas its general scenery is of rock, hill, and vale, and the singularities in Britannia's profile are not the flowing curves and graceful bends, but rather the straight lines which denote occasional fens and marshes. A mountain may be an uncommon object, but a fen is still more rare: a Cumberland mountaineer imagined the fen country to be "like the sands at Ulverston, only green."

Picturesqueness and beauty, grace and grandeur, are no attributes of the lowlands. The railway traveller, issuing from the deep hill cutting, or sweeping down from the lofty viaduct into the black expanse of fen, fastens his carriage window to exclude at once the turf smoke and the murky view, complaining "when will this dreary plain be passed." And the mariner bounding landward over the surgy deep, hails not the chalky cliff or the blue ascending

shore, but faintly descries beacons and steeple-tops, and actually sails for many miles up the fen rivers without beholding the low and level fields.

The physical history of the fens is probably their chief attraction; and in tracing an outline of their history, geological and agricultural, it will be advisable to show first what is the actual structure of the alluvial deposits forming this district, their origin, and the cause of their accumulation. We shall then attempt a delineation of the fen country as it appeared at successive epochs, from the conjectural ages of antiquity down to the modern era of steam drainage and scientific husbandry.

As introductory to this point it may be stated, that the cause of the fens having any existence at all is to be found in the geological changes which occurred before the fen land began to be formed. Investigation has demonstrated that only a thin crust of the world (from 30 to 50 miles thick,) is solid, and that the internal portions are in a state of fusion, the solid portion enclosing a fluid mass of fire and melted rocks, just as the skin of an orange surrounds the pulp,—what we call the everlasting hills and *terra firma* resting upon these burning foundations as “a habitable flowery earth-rind.” The rocks which compose the outer portion of the globe for the most part consist of strata or layers lying one upon another in a certain order, and exhibiting marks of aqueous origin. That is, they were mostly accumulated in water: and the process of their formation may, therefore, be illus-

trated by phenomena in actual operation at the present time.

It is well known that running water will wear away stone, and that the constant action of water, no matter whether as mountain torrent, melting snows, descending rain, or moisture frozen, is to disintegrate rocks, erode or scour away the stones, clays, and sands of which the earth's surface consists, and to carry this waste by brooks and rivers to the sea. This mud is held in suspension whilst the current continues rapid or in a state of agitation; but when the land-floods mingle quietly with the waters of the ocean or expand into a slow-moving and placid expanse, the sediment falls to the bottom and forms an alluvial deposit. Any obstacle that retards the motion of the stream, as for instance, the tides, the friction of an uneven shore, &c., facilitates the deposition; and thus nearly all rivers accumulate at their mouths broad plains of new and continually increasing soil. The Ganges, the Nile, the Italian and Dutch rivers, are examples of these phenomena. Another way in which water may form a new bed or layer of soil, is by violently transporting materials from one coast and precipitating them in a mingled mass upon other land. Again, oceanic insects may build their stony incrustations beneath the waves, and in time rear a new territory from the bosom of the deep; and crustaceans and infusoria in perishing may create a stratum of calcareous matter upon the ocean bed. There are thus various ways in which layers of earth and

rock may be laid upon each other by the agency of water.

Suppose that after a bed of soil has been thus accumulated, the flood should retire: vegetable growth might then spring up, and if this were next overthrown by an inundation and buried under fresh deposits, there would result a seam of coal (or fossil wood), or a subterranean stratum of peat like that of the Fens. Still further, if some of the water-born clays were subjected to the action of heat, they would become indurated clay, shale, or slate; and by means of fire and water many rocks might, in like manner, become changed, crystallized, and contorted. The whole of the great stratified formations bear evidences of having been heated, lacerated, and upheaved by the central fires of the earth. The mighty mountain ranges have been shot upwards for thousands of feet by the volcanic forces beneath, at the same time bursting asunder the water-deposited strata, and throwing them from their originally horizontal into a sloping or curved position. Were it not for this upheaval of the western parts of England bringing to the surface the ends of the strata which recline upon each other, the deepest shafts and profoundest caverns would not have afforded a knowledge of the beds which lie beneath us. The English formations dip generally toward the east and south-east, and in travelling across the kingdom from east to west, the various beds successively emerge from beneath, occupying the surface in long and narrow bands, generally ranging north-east and

south-west. Subterranean fire has also left innumerable traces of lesser action, the strata having been torn and displaced by earthquakes, and mountains of lava ejected from the boiling deeps below.

The beds which occur in the neighbourhood of the Great Level, and may be found beneath it, are as follows,—starting from the chalk hills of Norfolk, near Hunstanton, and making a section to the oolite hills near Lincoln, they form a descending order :—1. Chalk, the highest stratum. 2. Lower Green Sand, called “Car-stone.” 3. Kimmeridge Clay, extending not far from Lynn. 4. The Great Oxford Clay, of enormous thickness. 5. The Oolite hills of Lincolnshire, rising out from beneath the Clay. The Coral Rag is brought up by a saddle-shaped elevation near Upware, for about a mile in length; but this is the only case in the neighbourhood of the Fens. There is a fringe of Fen resting on the Cambridge Gault,—then a band of the Lower Green Sand,—then Kimmeridge Clay, occupying Cottenham Fen and the neighbourhood of Ely,—then Oxford Clay, which forms the great base of the Bedford Level and the Fens of South Lincolnshire. All these beds have been thrown into their present sloping position\* by the action of the great subterranean forces. An instance of minor disturbance by similar agencies is to be found at Ely, where an interesting displacement of the strata

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\* The dip is comparatively slight, perhaps little more than 1 in 400.

occurs. The ridge of high land, upon which Ely stands, consists of Kimmeridge Clay, capped by the Lower Green Sand, the latter bed being far from its natural range by Denny Abbey, Cottenham, &c., and forming what is called an "outlier." In the clay-pit, near Ely, are the clear traces of what is termed a "fault," *i.e.* the strata are not continuous, a break or fissure having been made across the beds by their elevation on one side and their depression on the other. The true position of the Lower Chalk is about 150 feet (judging from the numerous Cambridge sections) above the Lower Green Sand, but in this clay-pit a mass of dislocated Chalk is found at a lower level than the Green Sand,—so that the Chalk has fallen below its natural position, and the ridge of Ely has been thrown up by what is called an "upcast." The bed of Coral Rag, near Upware, has likewise been elevated to a great height by a lifting power from beneath.

After all the great stratified formations had been accumulated,—after the last skin, so to speak, had grown upon this planet, enwrapping what had previously been its exterior covering,—and after these had been uplifted, broken, and penetrated by liquid fire from the earth's hidden recesses, the surface received its present shape and contour from the denudation of moving water. In every locality of our island rocks were borne down, valleys excavated, and an undulating surface occasioned by the unequal resistance of harder and softer material to the abrasion of stupendous torrents in primeval

times. Over a greater part of the world are seen the marks and monuments of these bygone changes, which must have been of far greater magnitude and sublimity than even the Universal Deluge. Mountain peaks were overborne by the violence of floods, gigantic masses of rock were transported for thousands of miles, and carried over summits of great altitude, deep valleys were scooped out by torrents in the yielding clays, and ancient valleys choked up and hills piled upon the plains by the drifted conglomeration of earths and stones. From the varied phenomena caused by this catastrophe, (as described by Geologists,) it appears to have been nothing less than a subsidence of a great part of the northern hemisphere, by which the oceanic waters were precipitated over the land. This was accompanied by an advance of the arctic climate southward, and then occurred a partial re-elevation of the land with a return to a temperate climate.

The currents of this Great Northern Drift, in all probability, washed away the chalk hills which doubtless extended at one period across what is now the mouth of the Wash, and stripping off the upper strata, laid bare the Oxford Clay upon which the alluvial fens now rest. The Clay itself was deeply denuded and its surface left uneven,—the hollows being now overspread by the Fen alluvium, and the higher spots protruding above the superficial beds of clay and peat like islands in a sable ocean. At Ely, Haddenham, March, Whittlesey, &c., these hills remain, the denuding currents having swept away

the intervening portions of the strata. Coarse gravelly detritus containing large blocks of stone, and brown clay with chalk pebbles in its mass,—the ruins of those beds,—are here and there heaped on the surface to a great thickness, as at Ely, March, Whittlesey, Tattershall, &c., and gravel and sand of similar origin are also found in many localities underneath the fen land, reposing upon the Oxford Clay. The Great Level, therefore, rests not upon the newest and most recently formed geological stratum, but upon one from above which many thousand feet of clay, sand, and chalk have been removed; and, consequently, one reason why the alluvial beds which constitute the Fens were deposited in their present locality, was because of the low level to which the ancient stratum had been reduced.

An examination of the alluvial beds of the Fens plainly shows that they were chiefly deposited by the tides rather than by the common action of descending torrents and disemboguing rivers, although the land floods in some degree assisted in their accumulation. And this two-fold deposition was mainly owing to the lowness of the surface. The lower parts of the coast of this Island are, of course, those to which the rains of heaven, aggregated into natural rivers, would spontaneously flow, being guided by the systems of valleys formed by the denudation of the drift currents; and thus the *fresh water* sediment of the Fens owes its origin to those agencies, which, BY EXCAVATING THE ANCIENT STRATA SO DEEPLY AT THIS PARTICULAR POINT

AND BY FORMING RADIATING VALLEYS AROUND IT, converged the drain water of a great district of England toward one central outlet. The principal portion of the Fen alluvium, however, bears evidences of *tidal* action and was certainly deposited in the sea-water, so that its formation depended upon the RELATIVE LEVELS OF LAND AND WATER, and had the land been more elevated or the ocean more depressed than it then was, the Fens would not have existed in their present locality. According to the generally received hypothesis, the land subsided some hundreds of feet when the Great Drift was desolating the world ; and had the subsequent upward movement raised it for a few feet higher, the great base of the fens would have been above the reach of the tides, and the area now occupied by horizontal fen land would have been a district of hills and vales. A slight elevation of the land would now convert the Wash Estuary into a tract of marsh intersected by streams ; and so shallow is the whole German Ocean that if the British Islands were elevated 600 feet, they would be joined to the continent of Europe by an area of flat land.

Still further, the accumulation of so large a tract of alluvial land in this part of the kingdom arises not only from the gathering of the streams to this centre and the constant overflow of the land by the sea, but also from the SHAPE AND CONFIGURATION OF THE COUNTRY. For alluvial plains like the Fens are not always found wherever muddy rivers discharge into a shallow sea. The Great Level is not a peninsula, but a silted-up bay ; and, therefore, derives

its birth from the partial and local operation of those floods which not only scoured a deep gulf here, but left the hills as side barriers in such a position as to receive between them the warp-laden waters of the German Ocean, and guard them from the violent currents of the deep whilst they quietly deposited their slime. The alluvial beds of the fen were not accumulated upon the bed of an open sea, but within the tranquil area of an enclosed compartment, just as “warping” is now artificially done.

Similar explanations are applicable to the other great marsh grounds of England, as, for instance, the flat which extends inland for a considerable distance from Bridgewater, in Somersetshire; the district of Romney Marsh, &c., in Kent and Sussex, where indeed there is no high land to defend it from the fierce billows of the Channel, but where a natural bulwark of shingle has given it existence and protected it to the present time; also the low tract running inland from Yarmouth, in Norfolk, and bordering the rivers Bure, Waveney, and Yare, shielded from the fury of the northern surges, not by any ridges of reef or rock, but simply by the denes or sand-banks that form upon the shore; the champaign district lying about the river Hull in Holderness, Yorkshire; the wide spreading flats through which the Ouse, Trent, and Idle rivers merge into the broad Humber estuary; the long strip of low land skirting the river Ancholme through the heart of north Lincolnshire; and the belt of salt marsh along the east coast of that county.

## OUTLINE THE SECOND.

## TOPOGRAPHICAL VIEW.

BEFORE entering upon details respecting the fen land, it may perhaps be advisable to notice the limits and extent of the Great Level, and for the information of those readers who have not travelled over the various portions of this dull district, add a few words upon the general character of its soil and aspect.

The great basin of the Fens forms a receptacle for numerous rivers which flow into it on all sides, the flat land penetrating the high country for several miles up the courses of these streams. In the neighbourhood of Lynn, where a strip of clayey alluvium separates the foot of the hills from the Ouse estuary, the small river Nar empties into the harbour. Between this point and Downham Market the Kimmeridge Clay and Green Sand formations slope gradually up from the fen land, which there consists of a black peat. Near the village of Hilgay, which seems to be islanded by fen, the Wissey or Stoke river crosses the tortuous, boundary line; and at Brandon the Lesser Ouse or Brandon river issues from between the chalk hills and wanders into the expanding plain of peat. The gravelly highlands of Mildenhall are cut by the Lark or Mildenhall river, which bends between its crooked banks, seeking among its boggy fens the broad dark waters of the Ouse. The Cam enters the fen

between wide meadows, leaving the uplands of Denny Abbey and Cottenham on the west, and of Swaffham and Burwell on the east. The boundary of the Level extends westward, where the villages of Willingham, Over, &c., cluster upon the hill sides or on the summits of the swelling knolls. At Earith the "black Acheron of an Ouse river" winds with sluggish waters into the dark fens. The low hills of Oxford Clay and drift gravel border the flat land through Somersham and Ramsey, looking down upon the broad waters of Whittlesey Mere and the black bogs around it, until, at Peterborough, the river Nene,

"Slow winding through a level plain  
Of verdant meads,"

forsakes its sinuous course and flows into that great channel which forms one of the main arteries of the Fens. The high land continues northward, though but little elevated above the Level, crossing the course of the river Welland at Market Deeping and that of the Glen near Bourn. From Peterboro' up to Lincoln the western boundary line of the Great Level closely coincides with the course of the Roman Car Dike, which consists of a drain and bank. The Oxford Clay, covered in many localities with sand and gravel, rises up from beneath the black peat and alluvial land along the whole of this length, in some places (as between Billinghay and Lincoln,) ascending into bold forelands which look over the dim plain like cliffs over the ocean. At Lincoln the river Witham passes through a gorge in the

oolite limestone range, and with a band of peaty and clayey land on each side flows in a south-eastern direction to Tattershall, where it receives the river Bain, and thence onward to Boston. The gravelly moorlands of Bardney and Tattershall bound the Witham Fens on the east, at the latter place turning eastward to Revesby; and thence the Green Sand hills rise along the northern edge of the Fens through Keal and Toynton, commanding an extensive prospect over the clay and peat fens that stretch from their base towards Boston. Still further to the east, at Steeping and Firby, the Plastic Clay makes its appearance, forming an undulating surface but little elevated above the loamy marshes which extend between those villages and the sea-shore at Wainfleet.

Having now travelled round the limits of the Great Level, we will next pass through it to notice the main variations of soil. The more inland portions from north to south consist, more or less, of black spongy peat. In Lincolnshire the principal part of the level is a clay or a marsh loam, stretching inland from the whole line of coast. In Cambridgeshire, &c., the peat occupies a greater portion of the surface, being separated from the Wash Estuary by a tract of alluvial clay and salt marsh. There are many instances of the Oxford Clay, &c., piercing upward through the crust of peat. The villages of North and South Kyme, in Lincolnshire, stand upon this elevated ground; Eye and Thorney upon similar hillocks; and the railway, which lies upon

the fen land, passes by shallow cuttings through the elevated lands of Whittlesey, Eastrea, &c., showing in section the blue Oxford clay overlaid by several feet of drift gravel. March, Doddington, Chatteris, &c., are situated upon a tract of high land, so that the railroad passenger, gliding between these places through undulating fields rich with green herbage and luxuriant with trees and hedgerows, can hardly believe that he is in the very heart of the Great Bedford Level. Again, between March and Ely the railway passes the island village of Manea, and numerous villages pleasantly sited upon gentle slopes mark the neighbourhood of Ely, where gravelly lands and rising hills of brown clay give a happy contrast to the black boggy domain which envelopes them. The true Isle of Ely, including the high lands of Littleport, Ely, Haddenham, Sutton, &c., forms a ring-shaped island, enclosing a basin of black land, across which the traveller between Ely and Sutton may view the lofty ground of Haddenham, its spire peering grey through the dim smoke of the fen. Other villages occupy the upheaved lands south of Ely, and the stranger approaching the fens from this point might fancy that he was drawing near to the sea-shore, the pastured and wooded surface sinking before him into a dull hazy expanse which stretches onward without variation from the feet of the uplands to the horizon. Seen from any of its bordering hills the Great Level has a dead and ghastly aspect, having been fitly described as "*Nature laid out.*" Only a few years ago it was a district com-

paratively unknown by the public ; but since it has been bridged in various directions by long lines of railway, thousands of travellers, who had heard it described as a low, wet, and dreary expanse, prolific of wild ducks and agues, have found themselves almost unawares within its precincts, and have been conveyed swiftly and safely over its dark surface. These lines of swift transit over the various fens afford glimpses of some of their main features and characteristics, viz., the stagnant rivers lying in twisted lines between their rushy margins and angular ramparts of bank, the long drawn lines of drains, the broad green droves, the ditch-divided fields, the ragged sedge or broad water-plashes of an unreclaimed district, the smoke-breathing obelisks of steam engines, and the huge black mills flinging their arms to the wind. At some times of the year the train seems to be rushing through a vast "cane-brake" or jungle of corn ; at other seasons the labourer may be seen ploughing what appears to be mere soot ; and when the great reservoirs called the Hundred Foot and Whittlesey Washes are deluged by the upland freshes, the adjacent villages present a maritime appearance, each standing, as it were, on the brink of a wide and placid sea. If the traveller enter from the south, he finds the cuttings through chalk, gravel, or clay, suddenly cease, and speeds along over rich meadows bordering the broad-flowing and winding Ouse, or the lesser Cam, and stretching back from each bank to the wide slopes and bold headlands of the high country. During great floods these fields often

appear as one vast sheet of water, sprinkled here and there with trees in line indicating a hedgerow, a cluster of half-hidden thorn-bushes, or a half-drowned gate and rails, shown dismally above the tide. Leaving the vicinity of the high lands, the pastures become fewer, and the surface of black peat soil widens out into a seemingly boundless plain, undiversified with hedges, intersected with reedy ditches and dotted lines of pollard willow trees; the dullness broken at intervals only by small plantations, isolated cottages, or green osier beds. The stately fane of Ely is seen rising in grandeur high above the murky fen, standing, far away from any quarry, upon an isle surrounded on all sides by a tract of deep peat soil, once a verdant spot in the midst of "a horrid silence of bogs and thorns." The country must be wondrously altered now, when a near view of that building may be had from a firm and strong railroad laid across dry, well-cultivated, and flourishing lands, from what it was when King Canute floated over these fens in a boat, and, approaching the cathedral, composed a famous poem beneath its walls. Onward the stranger may pass through the very heart of the Level, but he will observe that this region, though gloomy, is rich and fruitful, for he is carried not over wide meres or between waving shoals of reed, but by fields of green bulky cole, by black lands beautified with bright healthy rows of young wheat, or covered with a golden forest of ripe grain. Between Boston, Spalding, and Wisbech, are the rich grazing grounds, pastured by innumerable

cattle and sheep, destitute of thorn fences, the ditches filled with green waving reeds, and long rows of willow supplying the place of other trees. Nearer to the sea the lands are chiefly arable, and there is a larger quantity of wood; but when the coast is approached, the plantations disappear, the wide marshes are bounded by numerous embankments, and straggling creeks give awkward fences to many of the fields. The sea itself rises at high tide many feet higher than the land, and thus not only the marshes next the outer embankment, but the whole of the Great Level depends upon the strength of the earthen barriers for protection from the waters. The Fens, therefore, resemble Holland with respect to their low level, having been reclaimed and defended from the dominion of the sea like that wonderful kingdom,

“Where the broad ocean leans against the land ;  
Her patient sons to stop the coming tide,  
Lift the tall rampire’s artificial pride.  
Onward, methinks, and diligently slow.  
The firm connected bulwark seems to grow ;  
Spreads its long arms amidst the watery roar,  
Scoops out an empire and usurps the shore :  
While the peat ocean, rising o’er the pile,  
Sees an amphibious world beneath him smile :  
The slow canal, the yellow-blossomed vale,  
The willow-tufted bank, the gliding sail,  
The crowded mart, the cultivated plain,  
A new creation rescued from his reign.”

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### OUTLINE THE THIRD.

#### CLASSIFICATION OF THE ALLUVIAL DEPOSITS.

Having already noticed the foundation upon which the Great Level rests, we come now to consider the superstructure that Nature has raised upon it. Investigation into the nature and origin of alluvial deposits is somewhat analogous, we imagine, to the study of diseases of the skin. "Pathologists," it might be supposed, "might surely discover more respecting the outside of the body than concerning affections of the viscera,"—yet such is the multiplicity and similarity of cutaneous disorders that the contrary is the fact; and, in the same manner, so closely do many alluvial, drift, and tertiary beds resemble each other, that less information seems to have been collected regarding the very skin and outer integuments of the world than of the older aqueous and volcanic rocks.

Very little is known to the public of the beds which constitute the Fen land; and the numerous theories of their formation have been generally based upon some few facts mentioned by Dugdale and other ancient writers, and upon an analogy with somewhat similar though remote districts. The fact is that *generalization* is here a work of great difficulty; as the strata when pierced exhibit such a variety of results in different localities, and it is not easy to identify a particular bed in various situations. And besides these obstacles in the way

of classification, very frequently it is a hard matter to determine whether a particular stratum be of fresh water or marine origin. The peat possesses imbedded remains, and the silt not only contains shells but often exhibits a laminated or tidal structure; but a great portion of the fen soil has none of these distinguishing marks;—as for instance the clay which in Marshland, Wisbech Hundred, South Holland, &c., occupies the surface between the salt marshes and the black land. In this bed of earth are no stones, and it is believed no shells or buried remains,—it has no traces of tidal action, *i.e.* it was not left by floods in successive coats; the conclusion that must be formed is that it is a sediment or mud deposited at the bottom of a lake or sea. The question then arises, is it of marine, fluviatile, or lacustrine origin?—and the answer seems to be rather in the shape and situation of the mass than in its aspect and qualities:

Some of the beds are local, others extend through almost every part of the fens; and when any particular stratum is hereafter mentioned as lying under or above others, it must be borne in mind by those who may happen to reside where no such deposit is found that we do not say the first bed invariably lies under or upon the second, but that it has been observed to do so at some particular place, and has never been found in a contrary position.

Comparatively little being hitherto known of the soils of this district, a great variety of facts have been collected for the purpose of elucidating their

structure and history; of which details only the general outlines and capital results need be here adduced.

The Oxford Clay and other ancient strata, with the incumbent sand and gravel, rarely form the surface or the immediate subsoil of the fens, except near the high lands, but undulate beneath the alluvial beds; in the southern and western portions of the Bedford Level being found 8, 10, or more feet from the surface, at Lynn 28 feet, at Boston about 20 feet, and at various depths in different localities. There seems to have been a spacious bay in which have accumulated the alluvial beds, raising the surface up to one uniform level. The subterranean gravel might be supposed to have been washed into this bay by the ordinary action of the tides; but it is connected with similar material upon the neighbouring uplands and the "islands" in the fens at an elevation far above the reach of the present oceanic waters. Or (such being the case,) it might be supposed to have accumulated like the shingle of Dungeness and the southern English coast (which is piled to a considerable altitude by the thundering breakers of the Channel,) were it not that its abundant fossils proclaim it the detritus of Drift-worn strata.

The first or lowest of the alluvial deposits appears to be *silt*,—a wet muddy sand; hard and blue at its greater depths, softer and whiter in its upper portions. This does not extend under the whole of the fens, but has been observed below all the other

beds. It is probably the bottom of the great "bay," and was doubtless a wide expanse of irregular sand-banks like those now choking the existing estuary. It is laminated in its upper parts, thus showing a tidal origin; and it abounds with cockles and marine shells. In many places it seems to have been accumulated on a shore, and elevated into mounds or ridges like those upon the coast at Skegness, in Lincolnshire, and along the Norfolk coast of the Wash, &c., where the sand, drifting by the winds into hillocks higher than the tidal flow, is bound into a compact mass by the creeping fibres of the *arundo arenaria*. It is thus found piercing the superstratum of clay at Wisbech St. Mary's, Gedney Hill, &c.,—running in veins or ridges a few feet higher than the surrounding fen, and at times scarcely a quarter of a mile in width.

The next bed in the series is the soft blue calcareous *Clay*, which is found almost everywhere beneath the peat fens, and seems to be the muddy sediment left by stagnant lakes and sluggish rivers. This stratum (varying sometimes to a red clay and to a whitish silty clay,) extends throughout a greater part of the Level, and must have been subject to the overflowing of the tides,—for channels of creeks with banks of raw silt exactly like our present salt-water creeks are found intersecting it. And in almost every part of the fens veins of silt (apparently the warped-up courses of creeks,) may be traced within it in nearly every direction. The clay could not have been formed by the tides alternately covering

and leaving it, else it would consist of layers or laminæ. Sea-shells are not abundant in the clay, but lie plentifully in the silt veins, and are also found upon the surface of the clay. Fluviatile and fresh-water shells are contained in it, and in the peat that overlies it; and from all these circumstances it appears to have been deposited in water partly salt and partly fresh. From the numerous old river channels, shallow and circuitous, which have been choked and dried up within the historic period, and from the innumerable silt veins which indicate more ancient streams, it is easy to form an idea of the many wanderings the fen rivers must have formed for themselves when pouring down in swoollen volume from the hills into a broad horizontal plain, where every direction afforded equal facilities or hindrances to discharge. These channels, by diffusing the waters, lessened their force and momentum seaward; and consequently the slightest impediment or tidal bar could stop the stream, change the current, and produce an inundation. Each bend retarded the motion of the water, thus causing a deposition of sediment; and this by raising the beds of the rivers precipitated them over the level. This clay may therefore be described as having been formed in an estuary subject to both salt and fresh water currents. It does not always rest, however, upon the silt or the older strata beneath; for there are other beds probably contemporaneous with the silt. Thus in the western Witham fens (between Lincoln and Billinghay,) occurs a

stratum of peat underneath this clay, and resting upon Drift sand; and at Bardney, the same peat rests upon "till" or boulder-clay. At Boston it has been found about 20 feet from the surface, resting upon sand, gravel, and stony clay. In several districts of the Huntingdonshire and Cambridgeshire fens, moor is also found beneath the soft clay. In the neighbourhood of Lynn it has been found below the soft blue clay, resting upon a silty clay, which contains shells like those now in the Wash; and this again has been observed to rest upon "till" or Drift. The soft blue clay is found beneath the subterranean peat of South Holland and Marshland, and under the clay fens of the former district. It is known all over the Fens as "blue buttery clay" or "gault," and is the enriching substance brought to the surface in the operation of "claying." It varies much in thickness; in many parts of the Great Level it is not more than 2 to 6 feet,—in some places 10, 12, or more feet; but in most of the southern localities the peat covering is too deep to allow of the clay being dug through. In West Fen (north-west of Boston,) it forms the surface, being from 1 to 12 or more feet in depth; and a stratum of it from 6 to 19 feet in thickness underlies the peat of East Fen.

The next bed (in an ascending order,) is the *Peat*, which spreads over a very large portion of the fen surface. It appears to consist of decayed vegetable matter; and the remains of plants and trees abound within it. The thickness of this dark crust is from

a few inches to 3, 4, or even 10 feet ; and in some districts, as near Whittlesey Mere, it forms bogs of much greater depth. Occupying the surface of the southern and western fens, it enters under the alluvial clay which borders the Wash. In Marshland it forms a subterranean seam, called the "moor floor," and is shown in the Eau Brink Cut sections covered by several feet of alluvium. The peat or "turf" of the North Level, Tydd Fen, &c., in approaching South Holland, disappears under the clay lands,—being found a few feet below the surface at Sutton St. Edmund's, Tydd St. Giles, and Sutton St. James, and at a greater depth along the course of the "North-Level" Drain and the "South-Holland" drain. The isolated tract of peat in East Fen (northeast of Boston,) dips in like manner under the marsh lands of Firsby, &c., and appears on the coast northwards of Skegness, forming both a subterranean and submarine forest. In some instances, two beds of peat have been found with blue clay below, between, and above them; and this seems to indicate a lacustrine origin, or an alternating succession of flood and vegetable growth of local and limited extent.

After the moor had been formed, the whole Level appears to have been so low as to be almost continually under water. Hence the black earth of the fens is not purely vegetable matter, but is mixed with silt and mineral sediment,—a complete coating of clay having been thrown upon the turf in some districts by the descending fresh waters. The tides

also seem to have flowed for a considerable distance inland, loaded with mud, sand, and animal and vegetable substances, forming by their deposition the loamy land of the marshes, and the more tenacious clay which lies between them and the peat fens. The salt water, by reason of its greater specific gravity, would as it were undermine the freshes, the force and volume of which would fix a limit to the advances of the sea ; and where this hindrance occurred (varying in locality according to the height of the tides and the weight of water from the uplands,) a deposit of slime would take place. Every bar of soil thus raised would act as a further check to the tidal current, and, consequently, fresh matter would be precipitated, and on that side (next the sea) from whence the floating sediment came. It is in this way that the ocean often forms, upon flat shores, a deposit lower and thinner as it recedes from the coast. Or if the tides had unlimited sway over the level, the result would be much the same,—the waters spreading placidly would gradually lose their sediment ; the coarser warp settling first, the finer particles floating further, the quantity becoming continually less, and the deposit, therefore, thinner.

And these modes of action are, doubtless, the origin of the clayey alluvium which covers so large a portion of the fen peat. For the *Clay* which rests immediately upon the peat is from 4 to 16 or more feet in thickness near the sea, and thins off like a wedge as it proceeds inland until it altogether vanishes and the moor comes to the surface. It is generally a

mass of silty clay, without marks of lamination, traversed by innumerable small rusty veins, some apparently of decayed vegetation, others of red sand, such as are seen in modern warp. It is either a hard "gaulty" clay, or has many beds of silt within, beneath or above it, like sand-beds in the new warp land. It often rests upon the buttery clay, and approaching the black land becomes of a peaty nature, or "skirty." The clay of Marshland, and of the central parts of South Holland, (called the "fen ends,") consists of this stratum. From Wisbech through the principal South Holland towns to the rich grazing district of Boston, it is a fat brown loam, varying from a few inches to 4 or 5 feet in depth, and resting upon silt: the higher grounds appear to have intercepted and retained a large proportion of the fertilizing matter suspended in the overflowing waters after the principal deposits had taken place. The Roman Banks were founded upon this clay; but since they were constructed the sea has covered it with several feet of soil; this recent deposit being chiefly outside the banks, and in some places reaching also for one or two miles inland. This clay, however, is not to be found in all situations by sinking through the newer silt; for the currents of the river estuaries and the Wash eroded it away in many places before the silt was accumulated.

The Marsh land, extending seaward of the Roman Bank through Marshland, South Holland, Boston, &c., consists of a silty loam or brown clay, with a subsoil of dry "sugary" silt; the

silt lying at first in plates, but lower down becoming a wet blue sand with imbedded shells. It is evidently a commixture of sand and sediment from the waves of the Wash, vegetable matter which originally grew as marsh plants on the rising mud only to be buried under fresh warp, and the animal substances floating in the water—the siliceous and calcareous skeletons of marine and fluviatile infusoria. It may be here observed that estuary deposits acquire their peculiar richness and fertility from the intermixture of the river mud with the thickening slime of the tides,—an estuary forming a wide receptacle exactly adapted for the mingling of the various marine substances with the mineral and earthy matters of the land-floods, and for receiving the exuviae of myriads of animalcules that float in the fresh and salt streams and perish where they meet. This modern creation of the sea has been reclaimed by successive embankments, and the industry of man threatens to encroach perpetually upon the Wash until cultivation shall thrive in its very centre.

It may be desirable here to compare the structure of our own Level with those alluvial deposits of North Lincolnshire, &c., which are usually considered as analogous to it.

The peat of East Fen, dipping north-eastward under the loam and clay, is found beneath the band of salt marsh which stretches along the east coast from Wainfleet to Barton-upon-Humber. About five miles east of the Wolds or chalk hills, it is observed upon the surface of the Plastic Clay, entering east-

ward under the alluvial clay of the marshes. At Waltham the subterranean timber is 3 feet from the surface; at Skidbrook the stratum of black earth is about 4 feet from the top. At Sutton it is at the level of low water, resting upon the soft greasy clay which seems the most constant of the Fen beds; and in certain places the forest crops out upon the shore. At Grimsby, and between Barrow and Barton, it is found at the same depth, consisting of peat with remains of trees lying upon similar blue clay. The deposit above the peat stratum is a marine clay, along many parts of the coast 20 feet deep,—at Saltfleet about 39 feet deep. Since this line of marsh was formed the ocean has reversed its action, and a considerable reach of land has been eaten away,—this encroachment having laid bare the submarine forest.

But in the Isle of Axholme (or that part of Lincolnshire west of the river Trent,) and in the remainder of the flat named Hatfield Chase (in Yorkshire and Notts.) is to be seen the most striking resemblance to the Great Level. The buried remains of that district are commonly referred to for illustration by Fen Historians, although few have actually examined them upon the spot; and therefore a few particulars will not be misplaced here. The same tidal action that deposited our alluvial clay highest next the sea, has been at work there,—the land naturally formed by the Trent floodings becoming lower as it leaves the river. Near that stream, at Althorpe, &c., the blue clayey warp is

several feet in depth, and underneath it are found the remains of trees lying upon peat moor. Below the 'moor' is a soft "pipy" clay, *i.e.*, containing pipes of red rusty matter, probably the decaying roots, &c., of marsh plants. Two or three miles west of this point (before the works for artificial warping were commenced) the uppermost stratum or natural warp was about 18 inches deep, with moor beneath it, containing oak, fir, and yew trees; whilst further inland the peat is at the surface. This peat extends westward into Yorkshire, deepening into that tract of moss known as Thorne Waste, —10, 12, or even 18 feet in depth. The whole structure, therefore, resembling our own Fens where the thin seam of peat, covered by marine deposit on the east, spreads upon the surface and attains a great thickness in the west.

A similar conformation is observable on the east side of the river,—both the surface warp and soft blue clay beneath, having been deposited by the wandering waters in ages long past. A bed of peat sometimes divides the warp from the clay; and the latter rests upon a forest embedded in peat, and which grew upon sand of the New Red Sandstone at a level beneath that of low-water in the Trent.

A celebrated geologist having been applied to respecting the theory which supposes the Fen peat to have been formed in consequence of a depression of the land, he replied, that regarding the question of subsidence he could offer abundant speculations but no good facts "and without details opinions are

good for nothing." He also thought that it would require a careful examination of the subterranean forest on the Lincolnshire coast in order to pronounce upon the fact and date of subsidence. Now the above information has been collated with a view of forwarding the solution of that question;\* and it is much wished that numerous observers would communicate the necessary facts belonging to their own localities. If our fen readers would take the trouble to enquire what is the nature, thickness, &c., of the various strata found in their respective neighbourhoods, and would communicate the results to the writer of this work, their assistance would be valuable, and lead towards the settlement of an interesting enquiry,—to be more fully introduced in the succeeding chapter. Such joint evidence might go far to substantiate a sounder hypothesis

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\* Incomplete as may be the above statements, they are the inferences and results obtained from a great diversity of facts, the collection of which has involved many miles of travel, numberless enquiries by letter and personal intercourse, and a personal inspection of most of the details. Some readers may perhaps impugn the accuracy of our inferences, as, for instance, that the *subterranean peat* is identical with the general peat of the Fens. We are not aware that the subterranean moor of Marshland has ever been traced in a continuous line from any point where it is 2 or 3 feet from the surface until it made its appearance on the surface, but we know that it is found nearer to the top as the black land is approached; and the identity of the "moor-floor" with the subterranean bed shown in the Eau Brink Cut, and of this with the fen surface peat we establish from the opinion of local observers, from the similarity of the substances themselves, and from the agreement of the levels.

concerning the physical history of our Fen strata than has ever yet been built upon the records and reasonings of Dugdale and De La Pryme, and the researches of geologists in foreign deltas totally unconnected with this Level.

It cannot be expected that a special survey will ever be made, boring 20 or 50 feet deep at every mile across several districts of the Fens,—such an undertaking would, indeed, reveal many secrets of alluvial anatomy; but sufficient means of search exist, and enough is already known,—the obstacle to be demolished being merely that which keeps the scattered and divided facts asunder. Let every possessor of a detail know that it is wanted:—aggregate the myriad items, and the whole labour is accomplished! If every intelligent individual that has sunk a well, excavated a drain, or dug a deep foundation, could be induced to tell what beds he penetrated, the effect would be the addition of a very important group of facts to our present store of geological knowledge. For we shall hereafter endeavour to show that not only would a vain curiosity be in part satisfied by a *deeper insight* into the Fen alluvials, but Science and History would also derive data for the solution of larger problems.

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## OUTLINE THE FOURTH.

### HYPOTHESES CONCERNING THE FEN ALLUVIALS—THE GREAT LEVEL AS A FOREST—ROMAN REMAINS—SUBSIDENCE.

The phenomena of tidal deposition, abrasion of coasts, growth of peat-bogs, &c., are important objects of study, as these enable the geologist by analogy to pronounce upon various points respecting the history of the great stratified formations which compose the outer crust of the globe. The series of fen alluvials are particularly useful for this purpose, because they can be traced in a certain order, overlaying each other like leaves in a book, until they finally repose upon the beds of drift,—thus assisting in the enquiry concerning the relative date of that vast catastrophe which sculptured the great features of our hemisphere. But their peculiar interest and value arises from the circumstance of their establishing a link connecting geology with chronology. Roman remains not only occur above the uppermost stratum, but occupy a place in the series; these historical monuments constituting the first terms in a scale of years, by means of which the comparative antiquity of the drift beds may be estimated. Without entering, however, upon an approximative computation of this kind, we may proceed to indicate the probable age of some of the deposits; especially as different authors have advanced such opposite or conflicting hypotheses respecting their formation. The subterranean timber is the chief perplexity; and

as the origin of the other beds was touched upon in the preceding "Outline," our remarks may here be confined to the peat and its embedded remains. Some writers suppose the wood to have been drifted or washed into its present situation; but the majority agree that it vegetated on the site where we now discover it, though they differ strangely in attempting to account for its growth, overthrow, and transformation into peat. "The forest was destroyed by the Romans," is affirmed by some. "Nay," exclaims another, "it was upset by an earthquake." "The trees decayed," says one, "in consequence of the Roman embankments hindering the outward passage of the land waters." "An error," writes another, "for these trees could not have flourished on such low ground until the Romans reclaimed it from the ocean,—the woods perished before the axes of exterminating Normans." To examine each of these and other theories would be a task too prolonged for us or for our readers; a few statements and inferences will perhaps be sufficient to guide conjecturers to the true solution of this natural problem.

It has been stated that the blue alluvial clay, on which the forest undoubtedly grew, was in all probability accumulated in an estuary or bay liable to inundations of both salt and fresh water; but how this water-made level was converted from a drowned marsh into a broad tract of wood comprising trees of immense bulk and altitude, many of them being oaks, &c., whose natural habitats are

not waters and swamps, is a paradox not to be explained by an appeal to "Roman engineering," "natural sea-barriers," or "secluded valleys" guarded from the sea although at a lower level—just as the country of the Caspian is lower than the main. Oak, fir, alder, and other trees lie prostrate beneath the coating of turf, with their roots firmly fixed in the soil below in the attitude of growth. The surface upon which they were planted is at a level considerably below that of the sea; for if the beds now covering the blue clay were to be removed the tides would deluge the whole plain with from 18 to 30 feet of water. How then was the dryness of this land maintained? It was not by the assistance of the embankments commonly designated Roman banks, because many feet of alluvium, older than those banks, overspreads a portion of the very peat which originated in the wreck of that forest. The spongy peat had evidently been formed over the Cambridgeshire fens by the decadence of foliage and destruction of the woodlands before the Roman roads were projected across them; for these causeways of stone are laid upon moor, in some places having sunk down into the rotten earth. It is impossible that any adequate natural sea-barrier could have been in existence; or if it be supposed that downs or denes of sand had been raised along the shore, it is impossible that the great rivers could have been artificially conducted over a broad country, elevated 20 to 35 feet above it; and the supposition of such a tract having been

drained by pumps or wheels at so early a period of British history, and not only perfectly and deeply drained, but during an interval of time sufficient for the springing up of colossal oaks and firs of an age and dimension entirely unexampled in England at the present day,—such an embanking and draining (indispensable at so depressed a level of the land,) is too preposterous to be accepted as an explanation. The difficulty is incapable of simplification, unless we suppose an altered elevation of either land or sea. The conclusion towards which every circumstance points is this, that after the blue clay had been deposited, and after it had been guttered by silty creeks and wandering rivers, an upheaval of the whole country took place, and then—a long term of years having been occupied by the growth of the woods—occurred a general subsidence of the land to its present level, the overflowing floods throwing down the timber and changing the level into a boggy waste. This we believe to be the inevitable inference from a comparison of the facts of the case,—the relative levels of the peat and the sea, the peat stratum as viewed in relation to the other deposits, &c. It may be as well to notice here an instance in which the various circumstances appear in a connected and striking position. In excavating the Eau Brink Cut, near Lynn, the Roman bank was cut through, when it was found to stand upon a bed of clay, over which 4 or 5 feet of deposits have accumulated. The clay was 8 feet in thickness, resting upon a stratum of peat, which (though containing oak,

alder, beech, fir, and hazel branches, stems, and roots, evidently on the site of their growth,) was only about  $3\frac{1}{2}$  feet above low-water mark. Any one who chooses to stroll for a couple of miles along the sea-bank on the eastern side of the harbour below Lynn, may witness (at low water,) wide platforms of this subterranean and submarine forest beetling above the waters like a range of black-crested cliffs, the soil having been partially washed away from above and under them.

Entombed in the fen peat, yet preserved by its antiseptic qualities, have been found the bones of a former population—the remains, not of men, but of wild animals of the woods, such as the wild-boar and deer. In the Wisbech Museum, among numerous vestiges of animals taken from within and beneath the moor, are the fossil skull and bones of a beaver, found in the vegetable deposit, together with the stakes and twigs conjectured to have been used by it. Horns of the aurock, red deer, and stag; jaws and tusks of the boar, &c., are frequently met with. Thus this Great Level, which was a peaty morass in the Roman era, (as testified by sections through the Roman roads,) and had then been so for a long period (as shown by the thick deposition of clay upon the moor before the Roman bank was erected,) was once a huge wilderness where the wild boar devoured roots and mast in the recesses of thick woods, the stag herded on the grassy glades, and the beaver colonized upon the shady margin of streams and pools. And prior to

this forest epoch the whole district, as we have before said, must have been a marsh, intersected with rivers and creeks, as is indicated by the silt veins (with abundance of cockle-shells,) discovered in the blue clay beneath the moor; and this again originated by the warping up of a great bay, the wide expanse of whose waters was broken only by the wood-crowned islands forming the present "high lands" in the fens. All this and still more has occurred since the Great Northern Drift; so that taking the age of the Roman bank (at least 1450 years,) as the first integer in the scale of time, and allowing a sufficient period for the deposition of the upper clay, beyond that for the slow decay of vegetation into peat, still earlier for the maturing of trees of several centuries' bulk, anterior to that for the accumulation of the underlying clay, and at a still remoter date for the growth and subversion of another primeval forest, what a vast cycle of ages, we find, must have elapsed since that Drift took place.

Whenever the subsidence of which we have been speaking may have occurred, it was certainly before the construction of what are called the "Roman banks;" for these ancient defences follow pretty closely the course of the present coast, running inland at various points in order to avoid crossing the river estuaries,—thus showing that the great streams discharged then in much the same way as at present, and that the land maintained the same relative level with the Wash. The depression, too,

must have happened previous to the Roman era, not only because the sections through the Roman roads show this to have been the case, but also because numerous undoubted Roman relics afford evidence of this country being at that time of much the same shape and figure as now; and the sinking of the land for a few feet would effect a prodigious change in the configuration of these flat shores. And there is nothing improbable or hyperbolical in the supposition of a general subsidence; for examples of a similar action are now actually at work in several parts of the world. Those who object to the idea of sinking land, and who maintain, therefore, that the forest flourished on an *embanked* country, may here, perhaps, step in and affirm the possibility of there having been a line of bank built by the Romans on the same site or else more seaward than the present "Roman" one,—the alluvium which has since accumulated upon the moor being thus more modern than that boundary, or perhaps formed in consequence of its destruction. Of course this hypothesis denies the antiquity of our old Roman bank; let us, therefore, enquire what are the evidences of its being the workmanship of the people to whom tradition has immemorially ascribed it. It was certainly constructed (if not by them,) either before or a very little after their time. It was in existence before the Norman Conquest; the Saxon charters making mention of various localities which must have been under the waves unless the country were already guarded from the sea: and

the alluvium just mentioned must have been already formed, as these places are founded upon it. It may have been the result of Saxon or even Danish industry. It may also be attributed to the labour of the Britons; for could not Druids who raised Stonehenge have cast up an embankment strong enough to defy the slow waves of the Wash? But this bank is unconnected with idolatry and superstition; and the British monuments of industrial improvements are of too humble a character to claim this great work as a companion. If, however, we regard this bank as a military defence, we must acknowledge that the tribes who constructed the "Devil's Dyke" and other fortifications or boundaries on the hilly ground, might likewise have erected this upon the shore. At any rate, whoever was the builder, the high antiquity of the bank is sufficiently established. The probability is, that it is a relic of Roman enterprise and skill; for those active invaders intersected the kingdom with highways, planted innumerable military stations, felled forests, fortified morasses, cut canals, established potteries, tilled the soil,—and this embankment is intimately connected with several undoubted Roman roads and stations. It traverses nearly all the east coast of Lincolnshire,—passing by Burgh, where ancient works yet remain to testify of Roman industry and warfare; by Wainfleet, which is considered a Roman sea-port; by Boston, where existed Roman fortifications; by a large Roman encampment near the "Old Saracen's Head" Inn; by Wisbech, where several Roman remains have

been discovered. Lincoln was one of the principal Roman stations in Britain ; and there are numerous Roman forts all round the Fens upon the borders of the high land,—as at Horncastle, Tattershall, Billingborough, Bourn, Castor and Horsey near Peterborough, &c. None, however, appear to have been found *within* the Fens, from which it is inferred that this boggy wilderness was fenced in as being the refuge of unconquered Britons, the bank having been a rampart of defence instead of a dyke for reclaiming drowned land. Roman remains abound in the neighbourhood of the bank. Roman urns and swords have been dug out of it. But the strongest circumstance of all is that whilst these relics are discovered on the *land* side of the embankment, none occur upon the *sea* side ; almost a proof that it was in existence at the time of the Imperial government of Britain. Among the Roman antiquities found are coins and foundations at Gedney and Sutton St. Edmund's, urns and coins near Whaplode Drove and Fleet, vessels and urns near Moulton, and Roman cisterns and coins at Spalding. Besides, Roman weapons, utensils, urns, coins, and mill-stones, (for grinding grain by hand,) have been discovered at March and many other places in the Fens ; and lately a Roman skeleton has been disinterred at Earith,—it was found with a lachrymatory (or vial for preserving tears,) under its head, and is now in the Wisbech Museum. Three pecks of copper coins, piled down edgways, most of them of the Emperor Galienus, were found at Fleet not

many years ago. A Roman sword was dug out of the old bank, not far from Fleet mill; and a glazed vase, conjectured to be Roman, was found some little time ago in the bank at the Four Gouts, six feet deep in the centre of the bank.

All the large district sea-ward of the embankment being *newer* than that work, those of its inhabitants who have not travelled beyond the precincts of the lowlands have never seen land which formed a portion of the Earth's superficies when Adam tilled the soil, nor beheld a rock over which the waves of the deluge rose; and Caesar's adventurous legions must have conquered our island long before the ground they cultivate was in being. They cannot look upon their soil—unformed by the hand of man—as most ancient; but for a relic of remotest antiquity must refer to an artificial embankment, reared by spade-men and earth-carriers.

The Car Dyke, skirting the high lands west of the Fens, from Peterborough to Lincoln, is a fine specimen of Roman engineering. It bounded the Level on the west as the bank did on the east, and appears to have been used for navigation; part of it being still employed as a drain and canal.

There are several Roman roads running both near to and across the Fens. The chief one within the district is that stretching over the Bedford Level, between Denver, in Norfolk, and Peterborough, 24 miles in length, about 40 to 60 feet broad and 1½ to 3 feet thick. It consists of a thickness of fine gravel, now become very hard; and in some places it is

composed of a layer of oak trees immediately upon the moor, (which is much compressed by the weight,) above them a paving of Northamptonshire flag-stone, and upon that alternate coatings of gravel and clay, which have now become cemented into a hard mass. In carrying the railway over the boggy land near Whittlesey Mere a similar method we believe was pursued; brushwood and trees being first laid upon the soft spongy soil, and then the harder material upon them. Two hundred years ago (according to Sir William Dugdale,) this great causeway was covered in some places with three feet of moor; but it is now generally about two feet higher than the fen land, with a few inches of moor upon it in some parts, owing, doubtless, to the subsiding of the surface through drainage and cultivation.

Only a few relics of the ancient Britons have been exhumed in the Fens. Several canoes have been found; and also "celta," supposed to be British axes or hammers. Specimens of their pottery are occasionally met with, and likewise fragments of their rude weapons. Some years ago, a canoe was discovered in Deeping Fen, 46 feet in length, from three to five feet eight inches in breadth, and hollowed out of a single log.—Numerous barrows, or tumuli, occur upon the outskirts of the Great Level. There are no less than six of these mounds near Wisbech; several in Gedney and Fleet, and in almost every parish abutting upon the coast towards Skegness and Wainfleet. As both Britons, Romans, Saxons, and Danes, however, occasionally reared

such heaps for boundary marks, sepulchral monuments, or other objects, it is difficult to assign them to any particular one of these nations.

In the Isle of Axholme and adjoining lands both east of the Trent and in Yorkshire, the alluvial deposits (as before observed) exhibit a somewhat similar order of succession to those of our own Fens; and it may be therefore inferred that the same causes produced both,—viz., an elevation of the land and subsequent depression, or else corresponding alterations in the level of the ocean. The peat conceals a forest which is founded upon sand of the New Red Sandstone formation; and as this former surface is in some places many feet lower than the sea, there seems to be no rational way of accounting for the growth of these trees, except by means of the changes just mentioned. But antiquaries can often afford to overlook simple difficulties, and build subtle speculations on coincidences. Thus De La Pryme, in 1700, says that “round about by the skirts of the Lincolnshire Wolds unto Gainsborough, &c., are found infinite millions of the roots and bodies of trees of all bignesses;” and as the trees have been mostly burned down or felled, and Roman remains have been there found, he concludes that the devastation of these forests was the work of that people. But why may not the Aborigines have set fire to the woods during a gale (the trunks lying principally in certain directions just as in our own fens,) and have chopped down much of the timber; the canoes and other British antiquities discovered

there confirming such a supposition? It is quite possible, however, that both the Roman and other remains may have sunk into the bogs long after the trees were destroyed. In the same manner, the Roman and British antiquities of the Great Level do not reveal the authors of those early "clearings;" the *low level* of the forest, however, tells us much. Archaeology must not confute geology; and fragmentary evidences such as porcelain, coins, armour, boats, &c., cannot demonstrate the occurrence of a physical impossibility.

Having now given a brief description of the structure of the country,—having treated with some degree of dulness and prolixity of the birth and parentage of the Fens, we will at once proceed with an account of their education and early training. Drainage will form our absorbing topic,—the earliest recorded particulars respecting which will now claim the attention of the reader.

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## OUTLINE THE FIFTH.

THE GREAT LEVEL DURING THE TIME OF THE SAXONS—  
FRUITFULNESS OF THE FEN ISLANDS—IMPROVEMENTS  
EFFECTED BY THE MONKS.

As the visitor gladly ascends from the cheerless mine into the upper sunlit air, so will our readers joyfully emerge from the dimness and uncertainty of these Fen “diggings” to the surface region brightened by the light of written records,—a light feeble and hazy, indeed, at first, glimmering on reedy grounds and watery plashes, but growing in lustre with the progress of years, until flocks and gathering herds are shown by the illumination, while steam-chimneys and revolving sails cast their shadows on the drying fields, and cereal harvests gild the sable plain.

The early ages are to a great extent wrapt in conjecture, so that we may say with the historians “a cloud hangs over this part;” but as we come down to modern times we shall find that Fen history is quite as decisive and complete as any other collection of documentary detail. We must, however, warn our readers in the outset that we do not profess to name the dates at which such and such properties changed hands, or to note the erection of such and such a mansion, or picture the rise and advancement of the various towns with their guilds, corporations, and charities, or dilate on the glory of those titled names which now bear arms upon their

chariot doors as their ancestry bore arms on their mailed war-steeds. Neither shall we discourse of the ecclesiastical beauties and rarities of the district; we shall omit all reference to groins and friezes, plinths and architraves, transoms, quatrefoils, and fillets; shall likewise eschew all passant griffins, empaled ermines, sanguine chiefs, chevrons argent between quarterly lozenges, “a horse’s head gorged,” or “a man’s head, bearded, proper;” and shall endeavour to avoid all sinister bends, engrailed bars, wavy fesses, and other heraldic marvels. Our notices will be of a rural character, containing only such statements as will help to exhibit the advances of agricultural industry in the improvement of the soil and the amelioration of the climate.

It is unnecessary to specify the various guesses that have been ventured as to the condition of this Level before the Roman invasion, when it formed part of the extensive country of the Coritani. We can fancy it, however,—from what has been adduced in the preceding chapter—to have been a succession of wood and water, our skin-clad and woad-stained forefathers feeding herds of oxen on the higher grounds, chopping thick trees into heavy canoes, and paddling with them over the shallow pools,—without the intention of either fishing or fowling, as they lived upon flesh and milk.

During the five hundred years which elapsed between the arrival of the Romans and that of the Saxons, these Fens are not specifically mentioned in any annals that have been preserved to us; and it is

not until 200 years after the landing of the Saxons that we find a recorded indication of their state. About the middle of the sixth century of the Christian era, that "stern, indomitable, rock-made race of men" had subdued the whole of England, dividing it into eight kingdoms, whereof East Anglia and Mercia were those in which the Fens were included. The former comprised the provinces of Norfolk and Suffolk with most part of Cambridgeshire, its chief towns being Norwich, Thetford, Ely, and Cambridge. The latter extended from the Humber to the Thames, and from the Severn to East Anglia and the German Ocean. In the seventh century monasticism spread rapidly in England, and the desolate islands of the Fen district were chosen, appropriated, and inhabited by the religious votaries. We are told that these abodes were selected by those "who, out of great piety, betook themselves wholly to the service of God, and strict abstinence," not only as being places of solitude, but also for the "conveniency of fish, that being the chief part of their food, after the rule of St. Benedict." The first monastery erected in the Fens appears to have been at Peterborough; and it is in the Charta given to the abbey of Peterborough by Wolphere, King of Mercia, in 664, that we find the first mention of the Fens. His Majesty granted the abbot and monks many lands, waters, fishings, fens, and meres, pointing out the bounds of his gift, which, by the outlandish designations, such as Cuggedic, Raggewilc, Paccalade, &c., seems to have

included most of what is now called the North and Middle Levels. Robert of Swaffham represents this fen as “of no small benefit to the bordering people; for they have wood and other fuel for fire, and hay for fodder; as also reed for thatching of their houses! with many other necessaries. There are likewise divers rivers, waters, and great meres for fishing, the country abounding in such things.”—At Ely, Crowland, Thorney, Spalding, Bardney, &c., religious houses were founded, and very soon after the Norman Conquest there were almost innumerable chapels, chantries, priories, and nunneries springing up on all sides, insomuch that William of Malmesbury, (A.D. 1135,) speaking of this county, says, “It is full of monasteries, and large bodies of monks are settled on the islands of these waters.” The descriptions given by the Saxon Chroniclers are so graphic that we cannot do better than transcribe them as testimony of the ancient aspect and condition of the Fens. The author of the “Life of St. Guthlac” describes the Great Level as “A hideous fen of a huge bigness, which beginning at the banks of the river Grant, extends itself from south to north in a very long tract even to the sea; oftentimes clouded with moist and dark vapours, having within it divers islands and woods, as also crooked and winding rivers.” Dugdale treats us with the following marvellous portrayal of the fens about Crowland, and some of their outlandish inhabitants; the latter part of the description will remind the reader of some scenes in that interesting novelet—

the “Camp of Refuge :”—“When, therefore, that man of blessed memory, Guthlach, had found out the desert places of this vast wilderness, and by God’s assistance, had passed through them, he enquired of the borderers what they knew thereof, who related several things of its dreadfulness and solitude, there stood up one amongst them, called Tatwine, who affirmed that he knew a certain island, in the more remote and secret parts thereof, which many had attempted to inhabit, but could not for the strange and uncouth monsters and several terrors wherewith they are affrighted. Whereupon S. Guthlac earnestly entreated that he would show him that place. Tatwine, therefore, yielding to the request of this holy man, taking a fisher’s boat (Christ being his guide through the intricacies of this darksome fen) passed thereunto, it being called Cruland, and situate in the midst of the lake, but, in respect of its desartness, formerly known to very few; for no countryman, before that devout servant of Christ, S. Guthlac, could endure to dwell in it, by reason that such apparitions of devils were so frequently seen there. Not long after, S. Guthlake being awake in the night time, betwixt his hours of prayer, as he was accustomed, of a sudden he discerned all his cell to be full of black troops of unclean spirits, which crept in under the door, as also at chinks and holes, and, coming in both out of the sky and from the earth, filled the air, as it were, with dark clouds. In their looks they were cruel, and of form terrible, having great heads, long necks, lean faces, pale countenances,

ill-favoured beards, rough ears, wrinkled foreheads, fierce eyes, stinking mouths, teeth like horses, spitting fire out of their throats, crooked jaws, broad lips, loud voices, burnt hair, great cheeks, high breasts, rugged thighs, bunched knees, bended legs, swollen ankles, preposterous feet, open mouths, and hoarse cries; who with such mighty shrieks were heard to roar, that they filled almost the whole distance from heaven with their bellowing noises; and by and by rushing into the house, first bound the holy man, then drew him out of his cell, and cast him over head and ears into the dirty fen; and having so done, carried him through the most rough and troublesome parts thereof, drawing him amongst brambles and briers for the tearing of his limbs." Another legend tells us that "St. Guthlac was once hurried away from his cell by demons and carried by violence to the very gates of hell, into which they threatened to cast him, for invading their own island of Crowland." Traditions and myths of marvels and miracles respecting the "holy" men of ancient days have been handed down from father to son in most countries, gathering additional wonders with each transmission: and in this instance, the agues, cramps and fevers of a solitary swamp have appeared in bodily shape before the eyes of superstition and romance, and have had their hideous likenesses depicted as above. Though encompassed by lakes and reedy swamps, it appears that the high lands were cultivated and fruitful; for the men in holy orders of those days not only

obtained for themselves fat livings, munificent bequests, "golden drinking-horns," &c., but (unlike many of their modern representatives,) "ministered with their own hands to their necessities," and it is to them that the Fens owe all the earlier improvements in drainage and tillage. Regarding these favoured spots we are told that they had "a rich soil, and famous for pasturage." "In the country of the Gyrvii (says the Register of Peterborough,) there is a famous monastery called Medeshamstede (now Peterborough): the Gyrvii being those which inhabit near the fens, because Gyr in English is the same as profunda palus (a deep fen) in the Latin. For by the inundation and overflowing of the rivers, the water, standing upon the level ground, maketh a deep lake, and so rendereth it uninhabitable except in some high places which God of purpose raised (as may be thought) to be habitations for his servants who chose to dwell there. For in such places within the Fen do the monks of Ramsey, Thorney, Crowland, and many other reside, to which there is no access but by navigable vessels, except unto Ramsey by a causey raised with much labour on the one side thereof. Within the same precincts also is Ely placed, being an island seven miles in length and as much in breadth, containing in itself xxii towns, compassed on every side with fens and waters, and whereunto there are only three causeys." The Register of Ramsey Abbey says, "Forasmuch, therefore, as this place situate in the eastern corner of Huntendonshire where the chanel of the river Ouse

restraineth the bounds of the Fens is, for its bigness, the fairest of the fenny islands, and which many have endeavoured to extol, so that it needeth not our commendation; nevertheless, we will not wholly leave it untouched. On the west side (for on all other there is no access to it by reason of the Fens,) it is severed from the firm land with certain deep and boggy quagmires, in breadth about two bow-shot; insomuch as in times past the access unto it was by navigable vessels, brought thither through a slow stream with gentle winds; but now by much labour and no small cost there is with wood, stones, and gravel, a firm causey made, so that people may come to it on foot. In length this island doth extend almost unto two miles, but in breadth not so much; being environed with alders, reeds, green canes, and bulrushes, which do beautify it exceedingly; and before it came to be inhabited was full of all sorts of trees, (especially wild ashes,) the length and bigness whereof may be seen by the beams and rafters on the roof of the church. But now through tract of time the woods for the most part gone, the fertility of the turf is such as that the land converted to tillage beareth corn plentifully; nor is it less profitable otherwise, being full of fair gardens, fat pastures, shady groves, and rich meadows, which in the spring time make a most beautiful shew. Moreover, on the borders of it there are several meres full of Eels, as also spacious fens and pools abounding with divers sorts of fish and waterfowl; whereof one, called Ramsey Mere

from the name of the isle, much excelleth the other adjacent waters in beauty and profit; which lying on the most large and woody side of it, and pleasantly beating upon that sandy shore thereof called Mereham, maketh a delightful object to the beholders; in the deep and great gulfs of which mere there are frequently taken, by several sorts of nets as also with baited hooks and other fishing instruments, pikes of an extraordinary bigness, called hakedes by the country people. And though both fishers and fowlers cease neither day nor night to haunt it, yet is there always of fish and fowl no little store."

Among the improvements we read that the limits of the Isle of Ely were first set forth by Birthnod, abbot of Ely, who, "calling together the inhabitants on every part thereof, assigned them their several portions of land; and for a perpetual evidence of the possessions belonging to the church of Ely, he caused that large and deep ditch to be cut through the main body of the fen which was then called Abbot's Delfe, to the end it might remain as a boundary in that deep mud and water." And shortly after the year 900, in the reigns of Edward and Edgar, Egelric, abbot of Croyland, ploughed up a large proportion of the abbey lands for corn. "In dry years," says Ingulphus, "he tilled the Fens in four places, at the four corners of them; and for three or four years had the increase of an hundredfold of what seed soever he sowed. Amongst which that fen of Tedwarthar (now Dowsdale,) was the

most fruitful ; the monastery being so much enriched by these plentiful crops that the whole country thereabouts was supplied therewith, and a multitude of poor people resorting thither for that respect Crowland became a large town." Thus did Cultivation shed her bounties upon one of the most desolate and swampy regions of the Level.

Many stories have been handed down to us of King Canute ; perhaps the following from Camden will not detract from the dignity of that sage and heroic monarch. "He ordered the fen to be parcelled out among the several towns upon it by Turkill the Dane, who divided it in such a manner that each town had such a proportion of fen for its own use as each town had firm land abutting on the opposite fen. He ordained that no township should dig or mow without leave in the fen belonging to another, and that they should all have a common right of pasture, *i.e.* horn under horn, in order to maintain peace and harmony among them."

We have omitted all mention of the great King Alfred, not because the wars and the government of the period exerted no influence upon the Gyrvii or Fen-dwellers,—doubtless they participated with the rest of the nation in the public weal or adversity,—but because we are not attempting a political history. The information we furnish mainly bears upon agriculture ; and we believe that Fen history (when expanded into volumes instead of being limited to general statements in a narrative like the present,) comprises more facts descriptive of soil and culture,

and renders a larger account of ancient English Agriculture, than the annals of any other portion of the kingdom.

In Smollett's History of England there is a portrait of William of Normandy, surnamed the Conqueror; haughtiness and rigour dwell in his countenance, and he grasps firmly a ponderous sword—this picture being a fit emblem or personification of his reign. They who wish for vivid ideas of the ravages committed at that period by noble thieves, of the inveterate resistance made by patriot thanes, and of the swine-feeding and hunting of Saxon farmers in their forest homes, must read that scenic history (of Richard the First's day) named Ivanhoe. A band of warriors made the Isle of Ely their stronghold, naming it "The Camp of Refuge;" and what the mountain fastnesses of Snowdon were against King Edward, the meres and turf-bogs were to William; and what Llewellyn was to his Cambrian valiants, Hereward was to his gallant men of arms. Warrior monks did here bid defiance to all troops of horse; and so well was the Isle defended all around by pool and quagmire, that the invader's bridges sunk beneath the footsteps of his adventurous soldiers, to the destruction of great numbers. A Norman knight, speaking of the supplies of this fortress which the king was then besieging, says, "For they matter not the siege, the husbandman not neglecting his plough nor the hunter his sports, neither doth the fowler cease from his employment. This isle is extraordinarily fruitful in all sorts of grass, there

being no place in England that hath a more fertile turf. Moreover it is compassed about with huge waters and fens, as it were with a strong wall; and aboundeth not only with domestic cattle, but with a multitude of wild beasts, viz., harts, does, goats, and hares, both in the woods and near the fens: as also ermines, pole-cats, weasels, and the like vermin, which are taken with traps and other engines in the winter-time. And of fish and fowl which there breed, what shall I say? At the flood-gates upon the skirts of those waters, what a vast company of eels do they take in nets! as also mighty pikes and pickerells, perch, roach, and sometimes greater and royal fishes. Of birds, likewise, there be innumerable: so also of geese, bitterns, sea fowl, water-crows, herons, and ducks, in abundance; especially in the winter season, or when they moult their feathers, whereof I have seen three hundred taken at one time."—This description needs no comment; we have only to extend the particulars to the other fen islands, in order to obtain a lively representation of the nature of the whole level.

Gold is often stronger than steel; and accordingly the Isle of Ely was treacherously delivered into the hands of the king,—just as in the late struggle for Hungarian freedom, when armies failed to overpower, diplomacy seduced. Turbulence and blood-shed mark the annals of many succeeding reigns; and but few agricultural improvements were effected in the Fens. One or two circumstances, however, we must not omit. Richard de Rulos, Chamberlain

to William the First, commenced a work of enclosure ; “ he was much addicted to good husbandry, viz., tillage and breeding of cattle, and took in a great part of the common fen adjacent to Deeping, and converted it into several, for meadows and pastures.” He also enclosed all his lands eastward of that town, “ excluding the river of Welland with a mighty bank, because every year almost all his meadows lying near unto that stream were overflowed with the continual inundations thereof ; for which reason this place, called Deeping, had first that name, *id est*, a deep meadow : and erecting upon that bank divers tenements and cottages did, in a short time, make it a large town, whereunto he assigned gardens and arable fields. And by thus banking the said river reduced those low grounds, which were before that time deep lakes and unpassable fens, into most fruitful fields and pastures, and the most humid and moorish parts thereof to a garden of pleasure.”

Henry of Huntingdon, an historian, who lived in the reign of Stephen, describes the Fen country as “ Very pleasant and agreeable to the eye, watered by many rivers which run through it, diversified with many large and small lakes, and adorned with many woods and islands.” And while this was a true representation of the general district, William of Malmesbury, writing at about the same time, discourses of particular spots in most glowing language. Thorney, near Ely, he says, “ is represented a very Paradise, for that in pleasure and delight it resembleth Heaven itself ; the very marshes

abounding with trees whose length without knots do emulate the stars. The plain there is as level as the sea, which with the flourishing of the grass allureth the eye, and so smooth that there is nothing to hinder him that runs through it. Neither is there any waste place in it; for in some parts thereof there are apple trees, in other vines, which either spread upon the ground or are raised up with poles. A mutual strife there is betwixt nature and art; so that what the one produceth not, the other supplies. What shall I say of the beautiful buildings which 'tis so wonderful to see the ground amidst those Fens to bear?"

The low lands of South Lincolnshire were afforested by Henry the First, and continued to be the King's hunting ground until 14 Henry III.; and while consisting of "lands, waters, marshes, and turbaries," appear to have abounded with "harts and hinds" and other animals of the chase.

Various works were executed from time to time for carring off the flooding waters from several districts of the Level; improvements in some localities having been effected on a considerable scale. Dugdale, in his "History of Imbanking and Draining," mentions the following circumstance:—"Forasmuch," he says, "as it so amply manifesteth how dismal a tract all those parts had long before been, and unto what an height of improvement they were at that time grown. In the year 1256, (40 Henry III.) William, Bishop of Ely, and Hugh, abbot of Ramsey, came to an agreement upon

a controversy betwixt them touching the bounds of their Fens; whereof in these our times a wonder happened; for whereas as antiently, time out of mind, they were neither accessible for man or beast, affording only deep mud with sedge and reeds, and possest by birds, (yea, much more by devils, as appeareth in the life of St. Guthlac, who, finding it a place of horror and great solitude, began to inhabit there,) is now changed into delightful meadows and arable ground; and what therefore doth not produce corn or hay, doth abundantly bring forth sedge, turf, and other fuel, very useful to the borderers; which occasioned much dispute and contention betwixt them that were the most antient inhabitants in those parts, nay quarrels and fighting, touching the bounds of such fruitful lands."

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## OUTLINE THE SIXTH.

### **EARLY CHANGES IN THE COURSES OF THE RIVERS—AGRICULTURAL CONDITION OF THE FENS PRIOR TO THE GENERAL DRAINAGE IN THE SEVENTEENTH CENTURY.**

Having now let eye-witnesses and ancient authors speak for themselves respecting the aspect of the country previous to any of the greater works of drainage, we will next advert to the courses of the natural rivers and the early changes made in them. By no means, however, will we mystify and bewilder our readers with delectable extracts from the presentations to Commissioners of Sewers; it can be of little interest to the general reader to know that a certain eau or sewer was “two feet in breadth and as much in depth,” from “Schepenhee to Bollesgote,” &c. Neither shall we quote the multitudinous disasters consequent upon burstings of the sea-banks,—the enumeration of the live stock drowned, crops devastated, &c., with their items of value,—being nevertheless of exceeding usefulness to exact historians. One circumstance may be here cited, although it has little to do with our mere outlines of history, viz., that “salt cotes” and “salt pans” frequently appear in the Commission records, as being the property of such and such persons or parishes. They are mentioned in the reigns of the Edwards; and it is probable that the Romans also established salt-works, occurring as their remains

do at various points along the course of the Roman bank. They are numerous at almost every part of the shore, from the vicinity of Lynn to Boston, Wainfleet, &c. Some are very extensive, as at Fleet mill and in the neighbourhood of Gosberton, &c. Mounds of earth cluster upon the flat ground; and shallow pits may be traced, into which the tidal water was formerly admitted, in order to be evaporated. Large heaps of cinders, often containing charcoal, surround the pans; the process of manufacture probably resembled that of making bay-salt at the present day.

Our readers are already aware that the surface of the Fens is lower than the sea at high water, and that therefore the safety of the whole country, with all its flocks, herds, crops, fruits, farmsteads and towns depends upon the ability of the barrier banks to hold out the boisterous billows of old Neptune and curb the restless hill waters within decent bounds. The drain-water of the low land escapes into the Wash only at low tide; while the upland floods ride above the fens, crossing them between lofty banks. But before the drainage, the surface was upon a much higher level than now, (by reason of the excess of moisture in the spongy moor,) and though barrier banks for the ocean were found necessary, the upland streams being unembanked did not deluge the country so deeply as they would now, but whilst drowning it in the wetter months, retreated again into their proper channels long enough to yield the inhabitants a supply of rough coarse

hay for fodder. And the surrounding hill districts, being unenclosed, discharged a much smaller amount of water by the Fen rivers than at present,—a circumstance greatly in favour of the fen-men. The great arteries of the district now discharge as follows,—the Ouse at Lynn, the Nene at Wisbech, the Welland by Spalding, the Witham at Boston, these, with their collected tributaries, pouring into the Wash. But in former days the Witham, it is supposed by some, flowed to the sea at Wainfleet; and it is certain that the Welland, Nene, and Ouse united with each other at several different points of the Fens by various winding channels, numerous records both on the page of history and the face of the country proving also that the grand natural outfall for these combined rivers was the Nene estuary. This fact brings us to consider the first work of magnitude which affected the general drainage,—and this we shall introduce to the reader's notice with one or two general remarks.

All tidal rivers have a tendency to choke up their channels by depositing bars of sediment upon their beds. And they depend upon the seaward current of fresh water to scour away the obstructions which continually accumulate; the outfall being clear or impeded according as the volume and velocity of that current is greater or less. If the Wash rivers descended from the uplands at once into the estuaries, like "the arrowy Rhone," no silty deposits could check their discharge; but as it is, they have to traverse many miles of level country

between the high lands and the sea,—losing nearly all the force and momentum they had acquired by their fall. Here, therefore, every drop of back-water becomes important: especially so in consequence of the shallowness of the bay into which the rivers flow, and the shifting sand-banks with which it is choked. And it may be easily perceived that several streams combined into one great outlet will be better able to beat back the tides and drive out the intruding mud, than if sent to sea in feeble currents through a diversity of outfalls. We cannot wonder, then, that when the great rivers wandered at will over every part of the Level, forming innumerable intersecting “eaus” and crooked “lodes,” the seaward channels should have grown up with undisturbed bars of silt; but we may well be surprised that when great efforts were made by the inhabitants to overcome this inconvenience their labour was never directed to the guiding of branch streams into a single course.

In early ages, the great natural outfall by Wisbech appears to have decayed: in what direction, then, did the people seek for a remedy? Homœopaths inculcate the danger of attempting to counteract Nature, and affirm that symptoms are not simply indications of disease but are the means of cure. Now, had the fenmen acted upon this principle they would have restored the wet lands to a healthy state without substituting the chronic malady from which the country is now suffering,—they would not have entailed upon us the burden of a costly artificial

drainage by diverting the main arteries to an improper place of discharge. The waters had usually overspread the fens during the "weeping months," but the lessening outfall seems to have occasioned a more prolonged inundation, visiting with disaster and destruction those numerous patches of ground which were partially drained and cultivated. The evil, therefore, appeared to be an excess of water, and the readiest way to get rid of this surplus was to conduct it into another outfall. The main channel of the Great Ouse passed south of the high lands of Ely and Littleport, and thence by Welney, Upwell, &c., to Wisbech. At Littleport it approached very near to the Little Ouse or Brandon River, which emptied itself below Lynn; and accordingly a cut  $2\frac{1}{2}$  miles long (excavated at some time previous to the reign of Edward I.) opened a way of escape for the swollen waters of the principal Fen river. The mischief, however, did not consist in the overplus of water, but rather in its deficiency: it was because the floods were allowed to expand over the country, instead of being forced to the general outfall, that the estuary bed became raised by deposit; and from modern experience we learn that all the drain water that could have been discharged in the winter would be barely sufficient to maintain an open passage to deep water in the Wash. As may be expected, the immediate effect of turning the drainage to a lateral outlet instead of conveying it to the original central point of discharge was to utterly ruin the Nene outfall by removing the scour,

to break the embankments which had defended Marshland (lying between the fens and the sea,) from the fen waters, and destroy the houses and cropping of all the low land adjoining the new and widening channel at Lynn. The permanent results have been such as were sure to follow the dividing of the water, which naturally evacuated at one mouth, between two outfalls, viz., a succession of overflows with their terrible calamities, and the exhaustion of enormous sums of capital in the artificial works devised by engineers for the defence and desiccation of the Level.

In the reign of Henry the Seventh, John Morton, Bishop of Ely, executed a work of some magnitude, and on a right principle as far as it went. The river Nene entering the fens at Peterborough divided into branches, the principal channel describing a semicircle between that city and Guyhirn. The worthy ecclesiastic, perceiving the injury done by this circuitous course, resolved to obtain a greater fall for the water by issuing it through a straight cut; and therefore "to avoid the many and crooked passages in the river Nene between Peterborough and the sea (by the way drowning many thousands of acres,) out of the whole ground made a new river, now called Morton's Leam, 40 feet wide and 4 feet or more deep, and a course of 12 miles long at least." Dugdale calls it "a work certainly of singular consequence, not only for the quicker evacuation of the overflowings of the Nene, but for conveniency of carriage from Peterborough to Wisbech." We

are told that Wisbech Fens were made good sheep-pastures in consequence, but no very general benefits seem to have arisen from a work which, however excellent in design, was inefficiently executed,—nor is it likely that a drain 4 feet deep should do much towards improving the general drainage of so many thousands of acres.

The condition of the country at this period, as far as we can understand from comparing the scattered items of information, was extremely miserable. The sewers, being not only of paltry capacity but also neglected and weed-obstructed, did not pass off the downfall waters; banks were continually bursting, and the high-land floods rushing upon the defenceless inhabitants; roads were impassable, crops attempted and destroyed, pastures scanty, cattle few, flocks unsafe; so that the wretched husbandman might often have uttered the complaint,—

“The ox hath therefore stretched his yoke in vain,  
“The ploughman lost his sweat; and the green corn  
“Hath rotted, ere his youth attained a beard:  
“The fold stands empty in the drowned field,  
“And crows are fattened with the murrain flock.”

The country between Wisbech and Lynn suffered most frequently and severely from the breaking of sea-banks by the fearful tempests, these catastrophes occasionally devastating “a thousand acres sown with corn.” On the firmer grounds in Marshland, Wisbech, Elm, &c., the growth of hemp and flax was, even at that early period, a common employment. Culture, however, could not be very successful, as

the drainage-water of an estate comprising many scores of acres, had frequently no larger outlet than a pipe (through an embankment,) "one foot square every way." The farmers chiefly subsisted by grazing, fattening their stock in summer, and salting down the meat in store for the remainder of the year. The long, broad and straight lanes or roadways that abound in the Fens, formed the roads from the homesteads to the commons and other feeding grounds; and in winter, when the lower lands were entirely drowned and the "droves" too soft for thoroughfare, raised causeways or crests were made use of for "common drift of cattle." Fish and wild-fowl, however, were the principal "live-stock" in the Fens.

But by way of elucidating the two pictures we are studying to paint, *viz.*, of the Great Level *before* and *after* the General Drainage, we will give the "jottings" of draughtsmen who sketched portions of the first scene on the spot.

Mercator's Atlas (by Hondius, A.D. 1632,) has the following:—"These countries from time to time, especially in the winter season, and sometime most part of the year, are overflowed by the spreading waters of the rivers Ouse, Grant, Nen, Welland, Glene, and Witham, having not lodes and sewers large enough to void them; but again, when the streams are retired into their own channels, it is so plenteous and rank of a certain fat grass and full hay (which they call Lid,) that when they have mown down as much of the best as will serve their turns, they set

fire on the rest and burn it in November, that it may come up again in greater abundance ; at which time a man may see this fennish and moist tract on a light flaming fire all over. Great plenty it hath also of turf and sedge for fuel ; of reeds also to thatch their houses ; yea, and of alders, besides other watery shrubs ; but chiefly it bringeth forth exceeding store of willows, which are often cut down with their infinite number of hairs and withes to hinder the violent force of the waters rushing against the banks. The inhabitants go stalking upon high stilts, and are given to grazing, fishing and fowling. Over against Lynn lieth Marshland, a little moist marsh country as the name implieth, divided and parted everywhere with ditches, trenches, and furrows, to drain and draw the waters away : a soil standing upon a very rich and fertile mould, and breeding abundance of cattle ; but so subject to the overflowings of the sea, tearing the dikes, and troubleth it so grievously, that it can hardly be holden out, and though there be many artificial hills and mounts made for the sheep at a spring flood to go up unto, yet divers times they and other cattle are drowned. Many conclusions have been tried for the drainage of the Fens, but take little effect ; and have not been undertaken by mean men, but also by the greatest of the country, yea by some kings. For ye must understand that these grounds are of such a nature and situation that if the rivers were but diked a good height on both sides, by giving the rivers more liberty, or else in turning and carrying new channels

some other way that the water might not stay in such abundance behind, they would become dry of themselves without the help of mills or drains." So much for the testimony of a disinterested Hollander who was likely to understand the subject, as he resided in a country of "a lowe, quaggie, and a spungy earth." The fenmen themselves had warm partisans and bitter foes among the courtiers and gentry, and the opinions which have come down to us (printed in most antique characters within dingy fenny-looking little volumes,) are, therefore, tinged with party prejudice; the most favourable accounts of the state of the district being, of course, those furnished by the opponents of the draining. The subjoined observations are extracted from "The Anti-Projector," written in opposition to a project of drainage in the reign of James the First. We withhold the old-fashioned orthography out of charity to the compositor and compassion for the phonotypic reader; not, however, without some sort of compunction for daring to alter the mysterious symbols of our erudite forefathers.—Those persons who contracted for the execution of a large district drainage were called Undertakers; "and they," says our author, "have always vilified the Fens, and have misinformed many Parliament men that all the Fens is a meer quagmire, and that it is a level hurtfully surrounded [or drowned], and of little or no value: but those which live in the Fens, and are neighbours to it, know the contrary.—For first, the Fens breed infinite number of serviceable horses, mares, and

colts, which till our land and furnish our neighbours.—Secondly, we breed and feed great store of young cattle, and we keep great dairies, which afford great store of butter and cheese to victual the Navy, and multitudes of heifers and Scots and Irish cattle have been fatted on the Fens, which afford hides and tallow.—Thirdly, we mow off our Fen fodder which feeds our cows in winter, which being housed we gather such quantities of compost and dung that it enriches our pastures and corn ground, half in half, whereby we have the richest and certainest corn land in England, especially for wheat and barley, wherewith by sea we do and can abundantly furnish London and the Northern parts in these necessities. All which fore-recited commodities make our Fens far more profitable to the owners, laying as they are for grass, than if they were sown with corn, rape, or coleseed.—Fourthly, we keep great flocks of sheep upon the Fens.—Fifthly, our Fens are a great relief not only to our neighbours the uplanders but remote countries, which otherwise, some years thousands of cattle would want food.—Sixthly, we have great store of osier, reed, and sedge, which are such necessaries as the countries cannot want them for many uses, and sets many poor on work.—Lastly, we have many thousand cottagers which live in our Fens, which otherwise must go a-begging.” Exhausting the Fens in favour of the higher grounds is thus an old-fashioned practice, but certainly does not betoken good husbandry. The above writer could not see how the clays were to

maintain their fertility if the fen manure were to be taken away; he should have considered that if the low lands yielded so prolific a store of natural herbage when subject to winter drownings, they would surely produce a much greater bulk of grain and green food under good drainage and cultivation. The payment of one-third of the land (as was demanded by the drainers,) might have been given with goodwill for such a drainage as we now possess; but as the first undertakers calculated only upon making the Fens "summer lands," which were still to be flooded in winter, we can readily suppose that the proprietors were unwilling to part with so large a proportion of their meadows for the extra area of feeding ground. "If the undertakers take from us a third of our Fens they destroy not only our pastures and corn ground but also our poor, and utterly disable us to relieve them. What is coleseed and rape," exclaims our author, "they are but Dutch commodities, and but trash and trumpery, and pills land, in respect of the fore-recited commodities, which are the rich ore of the commonwealth."

Navigation, of course, engaged the pens of angry disputants,—the fenmen declaring that water traffic would be injured by the drainers' "pernicious ditches." One of the pamphleteers of the day says, "The true state of Navigation here was this. The Fens being under water, as they were a great part of the year the watermen were much troubled to keep within the rivers, and, therefore, they were at the charge every year to have them beaconed out.

Their haling horses and the boys that drove them were forced to go up to the middle in water, and when they came to a dike or slough that they were to pass (which were very many in the Fens,) they were fain to take in the boy and horses into the boat, and set them out again when they were past it, which was no small hindrance and loss of time, *besides the death of so many boys and horses* with this unreasonable dealing." In summer, keels could often come up the Ouse river to within four miles of Ely, at which point they emptied their lading into "lighters." The highest spring tides appear to have flowed up to Ely, and it was only with these high tides that the gangs of barges could clear the "gravels" or fords which obstructed the channel.

An anonymous writer so early as the year 1606 (5th of James I.,) estimates that "by the decay of Drains above 500,000 acres of very fruitful grounds are made unprofitable; and thereby 40,000 people greatly impoverished. Navigation is decayed, most of the drains being not past a foot and a half deep, whereby no passage is by water in summer from place to place with merchandise as heretofore." If to these general facts we add a few more particular ones we shall be enabled to form a tolerably distinct conception of the state of the Great Level at that period as to its drainage and agriculture. A treatise published in 1629 contains some interesting statements:—"At Thorney Abbey my Lord of Bedford lets between 3 and 4 hundred acres of rising ground upon which the Abbey stands, for £300 per annum;

whereas the rest of his lordship of Thorney, containing 16 or 17 thousand acres of drowned ground is esteemed, as it now lieth, of little or no value. The like may be said of the Abbey of Crowland, of the lordship of Whittlesea, and of all the rest that consist of part dry and part drowned land. Yet the drowned lands are rich, as appeared in the two extraordinary dry years 1619 and 1620, when the edges of the drowned Fen being dry, yielded twice as much grass as the rising grounds did. I shall speak of a strange thing, yet it was related by a gentleman of good credit: Borough Great Fen containeth about 7000 acres, being usually so much surrounded that the dry places and all are not well able to bear the inhabitants' cattle: in those two years it was all dry and yielded such abundance of fodder that they received for a great part of summer £50. a day for the joysting of cattle, as they call it, out of the high countries." Large crops of hay were cut from the Fens, particularly in the "dry years;" "witness the great stacks which were then seen all along the wild Fens, as thick (to men's seeming that rode aloof,) as shocks of corn in a corn-field, and that of reasonable good grass."

We have here, then, the description of a tract of Fens grazed in summer by clumsy and unthrifty oxen, and flocks continually thinned by the rot, and mown to a great extent for winter fodder. Tillage was practiced upon the high lands and in favourably situated fens, producing wheat, oats, flax, and coleseed. A great portion of the animals belonged to

**AGRICULTURAL CONDITION OF THE FENS. 75**

small occupiers and commoners ; whilst hundreds of families earned a livelihood by fishing, fowl-catching, and turf-digging. A further light will be thrown upon these points by a consideration of the Objections and Answers, which were printed in profusion, concerning the proposal of a general drainage.

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## OUTLINE THE SEVENTH.

## ATTEMPTED PROJECTS—OBJECTIONS AND REPLIES.

The General Drainage was not accomplished by a *coup de main*, by the execution of a single design and the cutting and scouring of one system of new and old drains,—just as many good people used to imagine that the English nation was reduced to subjection in those few hours of hot sword-work at Hastings; but frequent schemes were attempted, and after the main rivers had been directed into new channels, and several great drains excavated, large districts of the Level were successively drained. The first attempts at Fen drainage after the Conquest, have left no traces by which they can be distinguished. Tradition says that, at the latter end of the fourth century, John of Gaunt (fourth son of Edward III.) who resided at Bolingbroke Castle, upon the northern border of the Level, attempted an improvement of the Fens by draining. And this is probable,—for he was the owner of considerable property in the Lincolnshire fens; and we know, by two inquisitions of Commissioners of Sewers in the year 1395, that some attention was paid to the several rivers and drains connected with the outfall through Spalding. A work on draining, published in 1629, says that he took great pains to perfect the drainage of the lands north of Spalding,—“he went into the country in person, and employed all his authority

in it; but because the country should have borne the charge, when he was once passed on to York, nothing went forward that he had projected, notwithstanding his many letters and increpations." This account seems circumstantial enough to be correct.

Margaret, Countess of Richmond, (mother of Henry VII.) is also reported to have dabbled in the Fen drainings; to what extent cannot now be ascertained. The book just quoted, says "That royal Lady, Margaret, Countess of Richmond, procured an admeasurement and division of all the surrounded grounds on the North side of Spalding, which before that time lay promiscuously. This was a great work, and of excellent use, not for those times only, but the fruit of it hath continued ever since, even unto these days, and will be a great guide in this draining business whenever it is undertaken. Neither did that royal Lady rest in this, but she sat herself amongst the Commissioners of Sewers, yea, and set her hand to the very work of draining, and, indeed, hit upon the right way: but in her work there were some notable errors (the world not being then so skillful) which being followed by the neglect of the country, in time forfeited her gracious intention."

According to the testimony of old Thomas Fuller, who wrote in the middle of the seventeenth century, contemporaneous improvements were attempted in the southern portion of the Great Level. He says that about the year 1436 (15 Henry VI.) "for I cannot attain the certain year,—some considerable

persons of our nation undertook the draining of the Fens near to Cambridge. They wanted not Dutchmen out of the low countries to assist them, where each peasant is born a pioneer ;” and vast sums were expended in making ditches and banks impregnable, as was supposed, to all assaults from inundations. But the next winter being wet and windy, the river Ouse, with the accession of its tributary brooks, swelled into a mighty torrent, and swept away all the bulwarks opposed to its progress. This accident is thus described in the quaint words of the narrator : —“ Down comes the bailiff of Bedford, attended like a person of his quality with many servants, and breaks down all their paper banks, as not water-shot free, reducing all to the former condition.” The total demolition of works, which were thought so excellent in design and execution, “ put the wits of that and succeeding ages upon the dispute of the feasibility of the design ;” and many curious arguments were brought forward for and against the undertaking ; an account of some of these, perhaps, may not be uninstructive : and the reader shall have them presently. It was during the progress of the greater projects, which were of a much later date, viz. the 17th century, and in the intervals between the separate “ undertakings,” that the works from which we have quoted were written. There appears at this period to have been two legal kinds of draining. One by Commissions of Sewers, according to a law of the 23rd of Henry VIII. ; wherein the Commissioners and Jurors (of

the same county in which the land lies) ought, once or twice in every year, if occasion required it, to view the drains and works, and amerce those defaulters whose share of repairing was neglected. The second is according to a law of the 43rd of Elizabeth, by which the major part of the owners and commoners of any township might agree with any person or corporation for a certain sum of money for the draining of their lands. Accordingly, various engagements of this kind were entered into,—some wherein the voice of the inhabitants and occupiers had its due weight and authority; others in which certain landlords, by using their “influence” with courtiers, got themselves constituted Commissioners and consequently Judges over the framing and fulfilling of their own self-made contracts with the other proprietors and commoners interested, often “draining themselves” at the disadvantage of their neighbours. Some good schemes were abortive; and among the better projects were intermingled several counterfeit ones,—such as most of those wherein the king was declared principal undertaker of the draining. Private individuals also endeavoured to fleece the public; an instance of which shall now be set forth. King James the First, immediately upon his accession to the English throne, took a personal interest in the work of Fen drainage, and is reported to have declared that “he would not suffer any longer the land to be abandoned to the use of the water.” Dugdale accounts for this circumstance from his “being a grave and prudent

prince, as also of a most noble and public spirit, and withal highly sensible of the general advantage which thereby would redound to the whole kingdom." But it is also probable that the prudent monarch was in some degree sensible, likewise, of the particular advantage that would redound to himself,—the vast crown estates and manors then in the Fens promising, upon their drainage and improvement, large revenues for needy followers and pleasant courtiers. Nevertheless, this "High and Mighty" prince did not blindly abet every plan of drainage without reference to the injury it might inflict upon the fen-men. The "Anti-Projector," from which we have previously quoted, says,— "*Primo Jacobi*, Sir Miles Sandys [a name well known by Fen chronologists] having purchased some hurtfully surrounded lands, to drain himself though to the drowning of his neighbours, (by bribes to courtiers) procured a Commission to drain the Fens, and got himself and his participants to be made Commissioners, and consequently Judges and Parties. Then they made a Level, and brought in those towns of Cambridgeshire, on the south side the river Great to be part of the Level, or hurtfully surrounded grounds: which words are convertible; and they contracted with themselves, and gave to themselves one-third part of those lands for draining and melioration [*a la* "Railway King,"] most part of which lands being in truth dry grounds, or bettered by overflowing, or at least able to drain themselves, by cleansing the old Sewers, had not the Legal

Commission of Sewers been obstructed by these undertakers.

This project was wittily discovered to King James in the beginning of his reign ; for one told the King he should hear a cow speak, which the King wondered at, and was persuaded to go to his stables at Theobald's where the cow was covered all over. The King commanded the company to withdraw, and uncovered the cow, and upon the horns there was a large parchment rolled up, and all the undertakers' fallacies discovered therein. The King enjoined secrecy, and in full Parliament spoke against it in these words,—“It is just the same case, my Lords, as though a pack of thieves should give me £20,000. to give them a patent under my broad seal to rob my subjects of £200,000.; by the which I should perjure myself and become a thief and tyrant.” And thereupon it was thrown out for a project.”

If the “Honourable” Sir Miles Sandys and fellow *drainers* had accomplished their design, and the country people had then overthrown their works and taken forcible possession of the awarded lands, we should no doubt have been told that an unruly mob, blind to their own interests and the welfare of the country at large, did ignorantly and wickedly oppose with violence an attempt to improve by drainage and cultivation the waste and unprofitable Fens.

Of the really useful though uncrowned attempts, the most important claims a notice here. Early in his reign, King James I. by his letters directed to

the Commissioners of Sewers for the Isle of Ely, Cambs., Hunts., &c., "encouraged their proceedings" in a design for the General Drainage of all the Fens south of the river Welland, omitting South Holland, Marshland, &c. In this project, and also in a preceding one (in 20th Elizabeth, 1578,) the Commissioners, contrary to their usual custom, actually began at the right end of their work. In the earlier scheme (which was for making a new drain to the sea, dividing the counties of Lincoln and Cambridge,) they caused the line of the proposed cut to be *levelled*; and inquired, by the judgment of workmen and otherwise, how much the expense of casting out one perch would be, in order that they might estimate the cost of the whole work. In the present improvement, although the outfall was not the main point of consideration, they adopted the sensible plan of ascertaining in the outset the nature of that soil through which the drains were to be excavated, and which formed both the basis and material of the barrier banks. A survey also was made, and the actual condition of the whole Level made known; so that, the possibility of drainage being fully determined, the requirements of the several districts, the most suitable directions in which to conduct the works, &c. &c., were decided in a business-like manner. In the year 1605 "direction was given to one Mr. Richard Atkins, of Outwell, (a person whose observations on these fenny grounds were very notable,) to make search, with an auger 11 feet long, on the skirts of the New Leam from

Geyhern to Standground steafe, to find the soil thereof at *eight feet deep*." Accordingly he searched across the whole Level along the new channel of the Nene, and along the river Ouse, finding moor in some places eleven feet deep, in some districts a covering of silt, clay, or mixed earth, with "rank moor all the way under;" in other parts it was "all red moor," and in others "black,"—"all vile moor by the whole tract." Comparing the account given of Atkins' borings with recent statements respecting the depth of the moor, &c., in the neighbourhood of the two lines that he traversed over the Fens, it appears that the surface has subsided since that time probably 5 to 8 feet. The prospect of the permanence and efficiency of the works was not very cheering, seeing that the drains must be cut in a soft and spongy substance,—the sides of the channels being, therefore, weak and little calculated for resisting the erosion of a flowing stream, and the banks loose and tender and ill adapted to withstand the insinuating pressure of swelling waters. However, with such a good commencement of proceedings, and with a powerful ordering of backward and easy Commissioners by the "Lords of the King's Majesty's most honourable Privy Council," the plan bid fair to advance favourably. In perambulating the Level with his great "auger of eleven feet long," Atkins had doubtless excited both the astonishment and dislike of the rude and rough-living fen-men; for those Lords by their letters desired the before-specified commissioners to "endeav-

vour to satisfy all such persons as, having no respect to the general good which was like to come by this draining, should oppose it, or use means to others so to do ; or otherwise to enjoin them to attend *the said council.*" Accordingly under this prudent, just, and judicious recommendation, the "said council" was held at Huntingdon ; the commissioners making return to that honourable board, that "after long debate, and *all objections heard*, they concluded with one consent that this work of drainage was feasible and without peril to any haven or county ; and not only so, but that they did reckon it the most noble work for the said Lords to further, and most beneficial to the countries interested, to have good by, that was ever taken in hand of that kind in those days." Whereupon there was a particular view of the whole Fens made by seven gentlemen, consisting of five knights and two esquires, who spent seven days in passing through the level, along its principal rivers and into its most boggy retirements. Being at midsummer and likewise an unusually dry season, the Fen country was probably as free from water as it could be at that period of Fen history,—so that the courses of the rivers and sewers would be more easily discerned, and the obstructions in the channels more readily found in their voyages "by boat;" and the roads over the Fens between the secluded villages would be in some places sufficiently dry to bear the tread of their steeds. Certainly this arduous travelling over the wildest, softest, slowest, and "most foun-

derous" of roads, and this paddling along stagnant drains through a clouded, dismal, and wretched country, viewing the size and shape of muddy banks and weedy lodes, and sounding the sewer channels with long poles to detect the shallows which required scouring, and the "gravels" or ford-ways that must be removed,—this was a truly honourable industry, however disagreeable it might have proved to those gentlemen of silk hose and lace frills and ruffles. From the numerous facts which they noted, it appears that the main rivers were remarkably obstructed with deposits of silt and mud, the Great Ouse having been in some places less than two feet in depth, the Nene waters running 28 miles in lieu of 6 to reach their outfall, the embouchures of the rivers being defective and choked, whilst the few diminutive sewers that existed in the Level had mostly grown up with earth and weeds. Thus, although there was a considerable descent from the soil of the Fens to the chief outfall, the country could have been little better than a boggy pestiferous wilderness in a hot season, partly swamp and partly flood; and in the winter a vast extent of shallow waters, chequered by reed-pleeks and osier-beds, whitened with flocks of wild-fowl, and frequented by boatmen with their nets and guns. The drains proposed at that time, however, were utterly insufficient for drying the waste: they made no special provisions for carrying off the floods from the numerous large districts that constitute the Level, but would merely have rendered the overflowing less deep and of shorter continuance.

The “true Content or Number of Acres in the Fens described in the general Plot,” was then delivered by William Hayward, surveyor, upon his oath, the total sum being 307,242 acres; the Lord Chief Justice Popham was employed by the King in the work; and *one short drain was cut*:—being all that was ever done! But much had been accomplished: Fen Drainage had made some way. A bold and compendious plan had been formed; the lowland population were aroused,—finding the Commissioners actually alert and in process of doing somewhat beyond their wonted routine of framing ordinances, amercing lands, and judging what townships ought to repair grievous defects in the old inadequate works. They saw Atkins probing the rotten soil; they beheld men of quality directing their steeds into the wettest fens, or barging along the reedy streams, not sporting for game, fowl, or fish, but devising a relief for inundation; and no sooner had these perambulators concluded their observances than Hayward comes with his rods and chains, measuring every district near and remote, no matter whether firm ground easy of access, impassable quagmire, or deep' mere. They had been convened and consulted, and had pronounced upon the feasibility and nobleness of the enterprise. In fact, so different was the entire business from what had been previously experienced, that this eventful year of 1605 may be dated as the commencement of a new era in Fen history. Though little of actual spade-work and sluice-building was realised at the

time, yet the labour attained its due importance, the basis of all subsequent improvements was laid, and a spirit both of advancement and opposition awakened, which has never since been found to slumber. The Bill introduced into Parliament appointed (among other good things) a Corporation, to have a portion of the recovered lands and employ the profits in the "perpetual maintenance of the draining, and satisfaction for drowning." The "Commons" were to be "stinted" by the Lords of the manors and greatest part of the freeholders and copyhold commoners. Provision was made for the cottagers upon the lord of the manors' waste, not having right of common; because they had been suffered to take benefit of the wastes, they were to be provided for when the wastes were reclaimed by the said lords. But notwithstanding all its excellent provisions alike for the amendment of the river channels and outfalls, the fair treatment of the undertakers, the observance of justice towards the land-owners and charity to the poorer cotters, the proportion of land to be abstracted as a recompense (consisting of 112,000 acres) seems to have spread out before the eyes of the fenmen as a tract too spacious to be replaced by the increased produce of the remainder; and by their remonstrant petitions the Bill was lost.

An Act, however, of a more limited and local nature was passed (1607) for the draining of 6000 acres of drowned land called Waldersea district, south of Wisbech; being the first Act of Parliament obtained for draining any isolated district of the Fens.

After a few years, the "general" scheme of Drainage was again revived. And as the Commissioners of Sewers were disagreeing in the matter, the Lords of the Privy Council appointed Sir Clement Edmonds as judge and arbitrator. In the year 1618, this worthy knight, accompanied by several gentlemen Commissioners, spent seven days in viewing the principal rivers and sewers of the country, to discover as to the feasibility of the drainage, "in which his peregrination (for it was an vncouth and wild way he went, and a long time he spent in searching into euerie nooke and corner,) he resolueth it might be done." From neglect of the outfalls of Nene and Welland; he says, the upland waters had no way for discharge but the level below Peterborough, "a great part whereof, and especially that about Thorney Abbey and Crowland, was in former times firm and good ground, and is now a mere Lerna, surrounded with water, and serving only for fish and fowle; which stop and overcharge of water there doth not only cause the like overflowing in the upland country, to their infinite loss and disadvantage, upon occasions of floods and swelling of waters, but the islanders themselves are in like danger, as well for those parts whereof they make use, as for their cattel and their own safety; out of fear whereof they oftentimes upon the swelling of the waters ring their bells backwards, as they do in other places when the towne is in danger of fire."

In the following year the Earl of Arundel was placed at the head of another general project, in

which it was wisely proposed to begin the work "at the sea by opening the outfalls of the Nene and Welland, and to make the same navigable to Spalding and Wisbech, which would draw the waters into their true and natural channel." In undertakings of this kind it had been usual for drainers to bargain for a certain proportion of the improved ground; a statute of 23rd Henry VIII. empowering Commissioners of Sewers to seize a portion of the proprietors lands by the legal form of first taxing them, and then taking possession for non-payment. But in the present case a new principle was acted upon. The Commissioners manifesting some amount of conscience, would not further a project which appeared to grasp at the fen land, arguing "that they had no power to take away any man's land without his voluntary assent," but if the drainers required no other recompence for their intended work "than a moiety only of *the clear profit which by their sole industry and charge they should bring unto each particular owner, .....*" they should be ready (as at the first,) to give the said undertakers all lawful furtherance and assistance." And as they refused to take advantage of the aforesaid unscrupulous enactment, valuers were appointed to ascertain the "present annual worth" of the fen lands, by means of which the remuneration might be calculated. After considerable turmoil and perplexity, however, the drainage was once more abandoned.

We will now give a summary of the arguments

that were from time to time published abroad by the literary belligerents on the Fen question. And, perhaps, the advocates of a general drainage, being chiefly of the upper classes, had the best of the quarrel as long as it was confined merely to a paper war.

Some narrow-minded persons objected to the attempt on the plea of religion, as if it were displeasing in the sight of the Creator for his creatures to exercise the patience and ingenuity with which they have been endowed by Him. It was said, "Hitherto shalt thou come and no farther," and it was therefore mistrusting God's providence for man to presume to set any other bounds to the water than those which "God hath appointed." On the other hand it was urged, that this objection only held good with regard to the ocean, "which is a wild horse, only to be broke, backed, and bridled by Him who is the maker thereof." It was a false and lazy principle if applied to fresh water, from the attacks of which, to defend the soil, human industry might be exerted with perfect propriety.

Another argument of the non-speculators was, that many had attempted, but none succeeded, in arresting this mighty assailant. "None ever wrestled with it but it gave them a foil (if not a fall) to the bruising (if not breaking) of their backs. Many have burnt their fingers in these waters, and instead of draining the fens have drained their pockets." To this it was answered, that the frequent failures in the undertaking did not prove its impracticability,

but only the want of ability in the design and execution.

A worthy alderman of Cambridge likened the fens to a crust of bread swimming in a dish of water, as, under a depth of eight or ten feet of earth, the whole was nothing, he said, but mere water. The draining thereof was, therefore, impossible. It was affirmed by his opponents that interest had betrayed his judgment into an evident error, and that his brain, rather than this floating earth, seemed to swim. The savans of Cambridge then urged that the Cam would have its stream dried up by the draining of the fens; and as Cambridge is concerned in its river, so the well-being of the whole country, yea of the whole kingdom, is concerned in Cambridge and its University, and the stream of knowledge would be dried up with the stream of Cam. It was, therefore, not reasonable that private men's particular profit should be preferred before a universal good,—or the good of a university. Assurances were given that no damage should accrue to the river Cam: on the contrary, “to take away the thief is not wasting nor weakening the wick of the candle.”

In this long controversy upon the project of a General Drainage, several objections were brought forward by those who professed to be the poor man's friends. They said that the fens were “nurseries and seminaries” of fish and fowl, which would be destroyed by the draining; that the sedge, turf, and reed would likewise be destroyed, and that many thousand people then gained their livelihood by

fishing and fowling in the fens, while the turf furnished fuel to the poor. The answers to these objections were forcibly though quaintly put. It was said that a large first course at any man's table, compensates for his shorter second course ; and who would not prefer a tame sheep before a wild duck, and a good fat ox before a well-grown eel ; while the people employed might turn their industry to a more profitable account. The sedge, &c., would be replaced by good grass and grain. He cannot complain of wrong who hath a suit of buckram taken from him and one of velvet given instead thereof.

A parallel to this objection occurred lately in Holland. The great Haarlem Meer, covering a surface of 40,000 acres, is now being dried by means of steam pumps ; but, before the work was commenced, many people doubted whether it would be profitable, and some, considering that a few hundred fishermen, who gained a livelihood on its waters, would be dispossessed, denied that it would be desirable.

It was then asserted, that even if these marshes could be drained, after vast difficulty and expense, they would quickly revert to their old condition, like the Pontine marshes in Italy : the speculators, on the other hand, urged that moderate care would prevent this catastrophe. Well, said the objectors, grant them drained, where would be the advantage ? the rich man would jostle out the poor from the commons. Wherefore, it was answered, was this a necessary result ? why should oppression be an

essential accompaniment to draining or enclosing? an equitable allotment would be made which would benefit the poor as well as the rich. A favourite objection was, that though many had attempted the work, all had failed; the project had proved "a philosopher's stone, or that accursed thing to the undertakers, for it had undone most of them that ever meddled with it." And the cause is plain, said the partizans of many of the commoners, "because it hath proved a grindstone to the faces of thousands of poor people." The fenmen complained that by a general draining they should lose their fishing and fowling. It was answered that there were some deep places in the fens, and also several meres which could not be laid dry, and these were the chief places for fish and fowl; but so great a benefit to the nation as the reclaiming and cultivating so many thousands of acres ought not to be hindered by the small consideration of eels and wildfowl. They said they should lose their reed and sedge; it was shown that good pasture and hay-ground would be far more valuable. "Besides these there are certain tacit and silent objections which some are either afraid or ashamed to utter, and yet are obstinately governed by them. I will name but two: the one is, the loss of their land; the other is, mere envy,—or, if you will give it a gentle name, private emulation. Thus, the lord or owner had rather be said to be lord or owner of 1000 acres, though they be scarcely worth to him 1000 shillings in the year, than part with 500

to make the rest worth 500 angels by the year. As for emulation, it is so notorious, so diffusive a vice amongst them, as a man may imagine it to be bred there, as Hydra was in the Fen of Lerna. I will put a case. John a Stile hath 2000 acres in the fen worth to him haply £50. a-year, and no other livelihood. John a Nokes hath 200 acres in the same fen worth £50. a-year, but besides he hath an inheritance of £300. a-year, and thinks himself, and so is, a gentleman of some reckoning; the other is but a poor man, and lives hardly. When the question of the draining of the fens comes, John a Stile is glad, and promoteth it all he may; but John a Nokes, his rich neighbour, what saith he? Shall John a Stile be a better man than I, who hath been always glad to shroud himself under my wings, —that I cannot, I must not endure; for if the fen be drained, his land may be worth £500. a-year, though he part with one-half for the draining; my improvement will be little worth,—no draining, therefore, by my consent. But enough," continues our author, in an unpleasing argument; "it being against my disposition to have but touched so harsh a string.

Having thus held the candle to the sun, that is, proved what no reasonable man can deny, that the draining of the Fens will be both honourable and profitable, give me leave to proceed to the second question, that is, whether it be feasible or no.\* \* \* I hold it for a certainty that it is utterly impossible to drain or fruitfully recover any notable part

of the Fen unless all the level whereof it is a part be jointly recovered. And this hath been abundantly proved by the miscarriage of all particular works, except Marshland; and that is gained by embanking, partly because it lieth on the outside of all the rest next the sea, and adjoineth the excellent outfall of Lynn, partly also because as much cost hath been and is bestowed upon it as the very soil is worth, for it now costs about £3000. a-year to maintain the banks, and so the medicine hath been as ill as the disease. Something might be said also for Holland Elloe by south of Spalding, which is bettered by the banks, but neither recovered nor secured; and likewise of Waldersey and such portions."

The drainage was necessarily the object of a General system of works, seeing that the chief evil was in the state of the outfalls; for the tides which had formerly flowed up the Welland to beyond Crowland and near Thorney were at that time seldom seen above Spalding. The river Nene, which should have discharged itself by the two branches through Spalding and Wisbech, ran by Whittlesea Mere, and meeting with the Ouse, Cam, and Brandon river, "overflowed all," and emptied leisurely at Lynn. And when "the waters were out" the winds raised billows upon them as on a sea, the violence of which no banks made of loose earth could resist. Perceiving the evils and their only remedies, the drainers affirmed that a comprehensive plan could be readily carried out: the fen-men looked upon it as

a physical impossibility. But prose alone did not satisfy the angry pamphleteers: they fell to combatting in verse; and we here exhibit a specimen of the rhythmic productions of each party. Dugdale gives us a ballad, entitled—

THE “POWTES COMPLAINT.”

“ Come brethren of the water, and let us all assemble,  
To treat upon this matter, which makes us quake and tremble;  
For we shall rue it, if’t be true, that Fens be undertaken,  
And where we feed in Feu and Reed, they’ll feed both Beef  
and Bacon.

“ They’ll sow both beans and oats, where never man yet  
thought it,  
Where men did row in boats are undertakers bought it;  
But, Ceres, thou behold us now, let wild oats be their venture,  
Oh! let the frogs and miry bogs destroy where they do enter.

“ Behold, the great design which they do now determine,  
Will make our bodies pine, a prey to crows and vermine:  
For they do mean all Fens to drain, and waters overmaster,  
All will be dry, and we must die, ‘cause Essex calves want  
pasture.

“ Away with boats and rudder, farewell both boots and skatches,  
No need of one nor th’ other, men now make better matches;  
Stilt-makers all, and tanners, shall complain of this disaster,  
For they will make each muddy lake for Essex calves a pasture.

“ The feathered fowls have wings, to fly to other nations;  
But we have no such things to help our transports.  
We must give place (oh! grievous case) to horned beasts and  
cattle,  
Except that we can all agree to drive them out by battle.

“ Wherefore, let us intreat our antient water nurses,  
To show their power so great as t’help to drain their purses;  
And send us good old Captain Flood, to lead us out to battle,  
Then two-penny Jack, with skales on’s back, will drive out  
all the cattle.

“ This noble Captain yet was never known to fail us,  
But did the conquest get, of all that did assail us;

His furious rage none could assuage, but, to the world's great wonder,  
He bears down banks, and breaks their cranks and whirligigs asunder.

"God Eolus, we do thee pray, that thou wilt not be wanting,  
Thou never said'st us nay, now listen to our canting;  
Do thou deride their hope and pride, that purpose our confusion,  
And send a blast, that they in haste may work no good conclusion.

"Great Neptune (God of seas), this work must needs provoke thee,  
They mean thee to disease, and with Fen water choke thee;  
But, with thy mace, do thou deface, and quite confound this matter,  
And send thy sands to make dry lands, when they shall want fresh water.

"And eke, we pray thee, moon, that thou wilt be propitious,  
To see that nought be done to prosper the malicious;  
Though summer's heat hath wrought afeat, whereby themselves they flatter,  
Yet be so good as send a flood, lest Essex calves want water."

To this we shall contrast a few stanzas, extracted from "A True and Natural Description of the Great Level of the Fens," published in 1685, and "formerly written by some ingenious hand." The poem contains no less than thirty-four stanzas, but the subjoined will be enough to satiate even the humorous reader :—

"I sing no battles fought, no armies foil'd,  
Nor cities raz'd nor commonwealths embroil'd,  
Nor any history which may move your tears,  
Or raise your spleens, or multiply your fears;  
But I bespeak your wonder, your delight,  
And would your emulation fair invite.

"I sing floods muzzled, and the ocean tam'd,  
Luxurious rivers govern'd, and reclaim'd,  
Waters with banks confin'd, as in a gaol,  
Till kinder sluices let them go on bail;

Streams curb'd with dammes like bridles, taught t'obey,  
And run as straight as if they saw their way.  
\* \* \* \* \*

"I sing of an achievement, from above  
Both blest and crown'd,.....which none can disapprove,  
But the poor fish, who now wants room to play,  
Hassocks, and men with heads more rough than they.

"Go on, brave undertakers, and succeed,  
In spight of British clamours; . . . . .

"When, to your glory, all your banks shall stand  
Like the immortal pyramide, and your land  
Forget it e'er was sea; . . . . .

"When Bedford's stately bauk, and noble drain,  
Shall parallel the streights of Magellane,  
Or Hercules his pillars, in due fame; . . . .

"When it appears, the all-sufficient soyl,  
With primitive strength, yields as much corn as oyl,  
To make our hearts strong, and our faces gay,  
Meadows so blest with grass, so charg'd with hay,  
With goodly kine, and beeves repleinist so,  
As if they stood upon the banks of Po.

"When, with the change of elements, suddenly  
There shall a change of men and manners be;  
Hearts, thick and tough as hydes, shall feel remorse,  
And souls of sedge shall understand discourse,  
New hands shall learn to work, forget to steal,  
New leggs shall go to church, new knees shall kneel.

"What trophies will you purchase then? . . . .  
What greater satisfaction? What reward  
Of higher price, can all the world afford,  
Than in a work of such renown and merit,  
T'engross the glory, and the bliss inherit?  
\* \* \* \* \*

"And now a muse as fruitful as the land,  
Assist me, whilst my too unskilful hand  
Describes the glories of this place; . . . .

"All seeds, all plants, and herbs, this noble field  
Doth, with a kind of emulation, yield;  
With roots of monstrous bulk, flesh, fowl, and fish,  
All that the belly or the tast can wish.

"Here grows proud rape, whose price and plenty foyles  
The Greenland Trade, and checks the Spanish oyls,  
Whose branch thick, large, and tall, the earth so shrouds,  
As heaps of snow the Alps, or pregnant clouds  
The azure sky, or like that heavenly bread,  
Which in the wilderness God's bounty shed.

"Scarce any tract but this can pastures show  
So large, so rich, and, if you wisely sow,  
The fine Dutch clover with such beauty spreads,  
As if it meant t'affront our English meads.

"The gentle ozier—plac't in goodly ranks,  
At small expence, upon the comely banks—  
Shoots forth to admiration here, and yields,  
Revenues certain, as the rents of fields,  
And for a crown unto this blest plantation,  
Almost in every ditch there's navigation."

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## OUTLINE THE EIGHTH.

GENERAL DRAINAGE—BEDFORD LEVEL—LINCOLNSHIRE  
FENS—OBSTREPEROUS BEHAVIOUR OF THE FENMEN.

Having broken from the accustomed track paced by sober Fen historians, we ought perhaps to apologize to those readers who, viewing the Level as their fatherland, expect us to tickle their ears with facts respecting the very ditches and sluices around their homes. We remind them that we are not attempting a connected history or record of drainage transactions; we are endeavouring to supply the public with sketches of the country,—displaying such objects as may be of interest and attraction to strangers as well as natives. However, if it be thought desirable, we have plenty to say respecting “the Indenture of Fourteen Parts,” “Lynn Law;” “Haltoft Commission;” “William, Duke of Bedford;” the dimensions of ancient “banks, crests, and dikes;” the situation of “clows, gotes, and pipes;” the summoning of proprietors to repair “causeys and bridges,” to cleanse ditches from “reeds and haffs,” and to keep their swine from undermining the drain banks, &c. &c. Our individual opinion is, that while many persons conversant with different fen districts might decipher the uncouth names of localities with some satisfaction, it will be pleasanter to general readers to

escape as much as possible from all such dull, tedious, and unattractive details.

The General Drainage may be said to have been effectually begun in the reign of Charles I., 1630, when Francis, Earl of Bedford, with 13 gentlemen adventurers, undertook to drain what is now called the "Bedford Level," containing about 310,000 acres, and including all the fen lands south of the river Welland, with the exception of South Holland, Marshland, Wisbech Hundred, Waldersey, and some other neighbouring districts. The drainers were to have as a recompense 95,000 acres, to be divided into three parts—43,000 to be appropriated to the construction of works, 40,000 to the perpetual maintenance of those works, and 12,000 allotted to the king. In the partition of the lands care was to be taken that the Commoners' parts were laid out next to their dwellings; and Owners were to divide their lands by such ditches as should be necessary to convey the rain-water to the great drains. In 1634, they received a Charter of Incorporation; and by a Statute of 15th Charles II., 1663, were "Incorporated for ever" to make laws and ordinances for the preservation of the works. And this "Bedford Level Corporation," consisting of one governor, six bailiffs, and twenty conservators, continue to support their ancient drainage works by means of taxes levied upon the adventurers' lands. The Earl undertook to make the fens "summer lands," or pastures and meadows free from water in the dry season of the year. His greatest work was the

cutting of "The Old Bedford River," 70 feet wide, and 21 miles long, in a straight line from Earith to Salter's Lode, near Downham. This operated in the same way that Morton's Leam had done,—it conducted the Ouse waters in a direct channel across the fens instead of allowing them to meander sluggishly along their old course by Ely. Two large drains, each 10 miles in length, were made to assist the drainage of the Nene; and many smaller ones were cut in different parts of the Level. A hundred thousand pounds having been expended in the course of three years in this endeavour, the work was partially accomplished; but the embankments proved defective, and a variety of causes conspired to defeat the efforts of the drainers. During the Commonwealth the work proceeded under the conduct of William, first Duke of Bedford, son of Earl Francis, united with a new company of participants. The famous Sir Cornelius Vermuyden, a Zealander—who had been engaged in draining the Low Countries, and in draining and improving the Level of Hatfield Chase in Yorkshire—was employed by both companies of adventurers as director of the works. He had partitioned the Bedford Level into three divisions, called the North, Middle, and South Levels, by which names they are known and distinguished at the present day, each having its particular rivers, banks, works of drainage, and outfalls to sea. A sufficient description of their situations in the Great Level will be afforded by saying that the former drains by the Nene, having

its outlet below Wisbech; the two latter empty themselves by the Ouse, having its outfall at Lynn. The banks of the Welland, breaking on the north side, overflows Deeping Fen; on the other, the North Level. The banks of the Nene giving way, deluges on one side the North, on the other the Middle Level: and if the banks which confine the Ouse break on one side, they lay the Middle Level under water, and on the other the South Level. The principal work executed by this Company was the "Hundred Foot or New Bedford River," running parallel with the Old Bedford, and about half a mile to the south-east of it. These rivers were embanked only on one side; so that they were free to overflow the space left between them. This long strip of land contains about 5000 acres; along the course of the Nene (then directed into a New Leam parallel with Morton's Leam,) is another open tract of 3500 acres; and the river Welland possesses a similar accompaniment of 1500 acres. These are called "Washes," being used for meadow in summer, while in winter the whole area is frequently flooded with water several feet in depth. They formed a prominent feature in the scheme of Vermuyden; and their action may be thus explained. The upland streams were supposed to bring down a sufficient amount of water to preserve their own outfalls, especially when aided by the Fen waters; but there appeared to be too much in winter and too little in dry weather,—the outfalls being too contracted for the freshes during the one season, and choked with

tidal deposits in the other. The "Wash" or reservoir being, therefore, connected with a river, fulfilled the same office as the air-vessel of a force pump: it received the sudden flushes into an expanded area and supplied a constant current towards the sea, thus regulating and equalizing the flow. This was ingenious; but experience has shown that the grand defect was in the condition of the estuaries rather than the irregularity of the river currents, and that nothing but the aggregation of force possessed by swollen winter floods can erode a durable channel through the growing impediments of sand. A sluice was erected near Earith to turn the upland floods out of their natural channel by Ely into the larger and straighter Hundred Foot; and another great sluice was constructed at Denver, to stop the tides and freshes from flowing up the old Ouse towards Littleport. Many main drains, such as "Vermuyden's Eau," "Sixteen Foot," &c., were cut, and numbers of sluices built. Doubtless these works greatly assisted the drainage of the Bedford Level; and the North and Middle Levels, which had been in a worse condition than the South Level, became dry enough for pasturing, and some parts for cultivating, in the summer. The South Level was but little improved; some say it was more deluged than before by reason of Denver Sluice hindering the seaward passage of the drain water. Vermuyden tells us that the two former districts were so far improved in 1652, that there were "about 40,000 acres then sown with coleseed,

wheat, and other winter grain, besides innumerable quantities of sheep, cattle, and other stock, where never had been any before."

We do not intend to detail the particular works of improvement: those who wish for information respecting the situation, dimensions, and uses of the different drains, and the designs and achievements of various engineers, will find a most admirable and interesting history of such matters, combining complete treatises on the principles and practice of Fen Drainage, in the "History of Wisbech and the Fens," (lately published) by Messrs. Walker and Craddock.

Our surface observations will next refer to the *Lincolnshire Drainages*; concerning which very little seems to be generally known. And these improvements are so entirely disconnected in history with those of the Bedford Level, that, although carried on at about the same period, it is difficult to speak of them contemporaneously without interrupting the narrative of the Bedford Level.

The first attempted drainage of Deeping Fen—about 25,000 acres of the lowest Lincolnshire fens, lying between Spalding and Market Deeping, bounded by the rivers Welland and Glen—was in the reign of Charles I. A company of adventurers widened and deepened the river Welland, and excavated several main drains; conducting the drainage-water through a culvert under the Welland and by the Earl of Exeter's Drain to sea. By these and other works the water was evacuated sufficiently well for the growth of grass and hay in summer,

and “had been made winter-ground in a short time, but for the unseasonableness of the times, and riotous letts and disturbances of lewd people,” so that the banks and sewers being neglected by the adventurers, it became again overflowed.

North of the river Glen is the Black Sluice Drainage, running northwards in a narrow tract for 20 miles, and then (leaving the western high lands) turning eastward to Boston; it contains about 65,000 acres of lands taxable to the Commissioners. Numerous “lodes” and “eaus” flowed down upon it from the western hills, and the waters of these were conducted by the Old Hammond Beck and other ancient sewers to the Witham river and Bicker Haven. The latter estuary, which formerly ran up from Fosdike to Gosberton, Bicker, &c., has long been an enclosed marsh, the barrier banks and mounds of the salt works being still visible. The lowest part of this district was drained by Robert, Earl of Lindsey, who, in 1638, cut a drain in about the same course now followed by the South Forty Foot. The lands were partially dried, so that the Earl and his participants entered upon the portions allotted them as their remuneration, and “did inclose, build, inhabit, plant, plough, sow, and reap, two years without disturbance; but the third year, in contempt of the orders of Parliament, the country-people entered and destroyed the drains and buildings, as also the crops then ready to be reaped;” so that it again became reduced to its former wet and uncultivated condition.

Similar attempts were made in Holland Fen, and in Wildmore, West, and East Fens,—the first lying south-west, and the three latter north-east of the river Witham. These efforts (to be hereafter adverted to,) can hardly have been said to have met with success, for, after the adventurers had enjoyed the fruits of their labour during a few years, the works of drainage were destroyed by the fenmen, and the country was again inundated as it had formerly been.

In the Bedford Level, also, there was a bitter feeling of hostility to the drainers, and the pen having been brought into rapid play in composing “Objections,” and “libellous songs to disparage the work,” heavier weapons were resorted to, and riots and tumults put the great enterprise in jeopardy. And here we come upon a great name, that of Oliver Cromwell,—who, before he ascended to be Protector of Britain, was for several years “a solid, substantial, inoffensive farmer of St. Ives;” his equable life there consisting of “diligent grass-farming, mowing, milking, cattle-marketing.” Carlyle says, a “petition” of the adventurers, addressed “to the Lord General,” sets forth that upon the “20th of this instant April,” (1653,)—exactly while Oliver was turning out the Parliament,—“about a hundred-and-fifty persons,” from the towns of Swaffham and Bottisham,—which towns had petitioned about certain rights of theirs, and got clear promise of redress in fit time,—did “tumultuously assemble,” to seek redress for themselves,

did "by force expel your petitioners' workmen from their diking and working in the said Fens," did tumble in again "the dikes by them made;" and in fine, did peremptorily signify that if they or any other came again to dike in these Fens, it would be worse for them, "the evil effects of which"—are very apparent indeed. Whereupon this Official Letter, or Warrant, which we may here insert for the annoyance or rectification of such persons as have been taught that this terrible "usurper" gloried in all riots and disturbances, and had no regard for justice and the rights of property.

" 23rd April, 1653.

" M.R. PARKER,

" I hear some unruly persons have lately committed great outrages in Cambridgeshire, about Swaffham and Botsham, in throwing down the works making by the adventurers, and menacing those they employ thereabout. Wherefore I desire you to send one of my troops, with a captain, who may by all means, persuade the people to quiet by letting them know they must not riotously do anything, for that must not be suffered: but that if there be any wrong done by the adventurers, upon complaint, such course shall be taken as appertains to justice, and right will be done.

" I rest, your loving friend,

" OLIVER CROMWELL."

This transaction shows the opposing parties appealing to arms on either side; in which struggle, of course, the weaker falls.

The arguments brought forward by the opponents of the Drainers had fully impressed the generality of people that the project of a General drainage was iniquitous if not impossible; and when remarkable

examples of questionable success were from time to time presented to the angry gaze of the fenmen in any part of the Great Level, (as we shall further see,) they assembled in riotous bands and began the fearful work of Destruction.

Perseverance, however, has finally conquered ; and in spite of the long opposition provoked by greedy and deceitful projectors, the drainers acting upon equitable principles at last succeeded in bringing an immense breadth of rich and productive land into profitable cultivation. Where the wild-fowl and the fish once held undisputed sway, now graze in luxuriant pasturage the ox and the sheep ; where the reed lifted its profitless head, now waves the golden harvest : the teeming plain rewards with its fruits the art and labour which made it produce ; and in reclaiming into healthfulness the once pestilent morasses, whose putrid waters generated miasma in the humid atmosphere ; in reducing to soundness and fertility a watery country that had become impassable in some places even to boats, in consequence of the sedge, reed, and slime with which it was covered,—so that many a “place of plashes and rough bent-grass” is now in our time “all yellow with wheat and barley in the autumn season,”—Industry has acquired a happier kingdom, and won a nobler fame than Ambition ever obtained by the conquering sword and cruel sceptre.

This great victory over the hostile elements has been peacefully achieved, the battle contested with peaceful weapons ; for the early quarrels and blood-

shed were not errors in the path of Industrial Progress but perils in the onward march of Liberty, —they were tokens of a strife between the injured and the oppressing.

And we think it right to refer, amongst other topics, to the injustice that marked the early proceedings in Fen Drainage, and not complacently pass it over (as is too common with Fen historians,) because the improvements accomplished were finally of so brilliant and prosperous a character. We abide by the maxims —Whatever is right is expedient,—Honesty is the best policy; and see no reason to doubt that if the General Drainage had been postponed until the population were gained over to the idea, instead of being commenced in a compulsory manner, the Great Level would have escaped half a century of wetness under the name of Drainage, and would long ago have had a surface as well dried as at present. This is merely equivalent to affirming that if the project had been delayed until the excellent methods of introducing great public improvements, which we have now long enjoyed, had come into operation, the work being done at a later period would most probably have been completed in a far more effectual and satisfactory manner. Our opinion is that we are not to regard the transactions of our ancestors as perfectly praiseworthy because they led to useful results; but should enquire whether, as Misused Power was found to originate a great good, Enterprise, equitably directed, would not have rendered that good a much more affluent blessing,

Now we are aware that in attempting to account for the popular dislike to draining and inclosing, we shall tread upon tender ground; for if we dared to insinuate that any Monarch, Lord, or Gentleman of high respectability had been guilty of injustice and oppression to the Poor, we should stand in imminent danger of being branded in name, if not arrested in person, as a "Chartist," "Socialist," "Leveller," "Demagogue," "Dissenter," &c., the "tendency" of whose teaching is to render the "Labouring class discontented." However, bearing in mind that, "the more a good thing is looked into the better," we will, for once, write without trembling about Gracious and Most Excellent Majesty, Royal Highness, Grace, Honour, Worship, Reverence, &c., and their little shortcomings and overdrawings in the *draining* of the Fens.

Reader! tear not the page: we are not commencing a Financial Reform tract; we are not going to grudge the Queen her salary, the Peer his patrimony, or the Bishop his revenue,—our words shall refer to a time some two hundred years from you.

Doubtless, much of the violence manifested by the fenmen originated from the folly, ignorance, and base passions of unmolested individuals whose interests were not in the least interfered with by the drainers. Again, many proprietors of common-rights joined those who proved themselves to be "thorough-going conservatives" in Fen matters, by denouncing every attempt at improvement; but

still there could not have been a very strong opposition from this class of men, because as a general rule, perhaps, the owners of rights had allotments of the open fields (when drained and divided,) as proportionate compensation; and under an improved state of drainage their share, covered as it soon became with sweet and good herbage, was worth far more than their former privilege of stocking the wet, coarse, and rushy common. A larger portion of the refractory population consisted of those whose livelihood was at stake, viz., fowlers, fishermen, and the numerous tenants who hired the common-rights of the owners, and had thus the privilege and profit of feeding a certain amount of live stock upon the Commons of the parishes in which they resided. These men, having lost an independent occupancy and been compelled to sell their cattle, receiving no compensation but the opportunity (perhaps) of earning day's wages upon the participants' farms, instigated and effected riots in several places,—broke the new sluices, cut the banks, deluged farms, burnt houses, ravaged crops, to express their dissatisfaction and heap revenge upon those that had ruined them and their families.

But if the poor were in the wrong, do the rich come off blameless?

The case we have already cited of "Stile *versus* Nokes," is an instance of a "notorious and diffusive vice" among the fen-men; and when we compare the circumstances in which the poor tenant and the

rich land-owner were situated before and after the draining, and the motives which respectively actuated them to opposition and demolition, we find in the losses of the poor man something that tends to palliate his offence, but in the conduct of the other we discover wilful, gratuitous, unpardonable obstinacy and malevolence. Sir William Killigrew (1649), in defending the Earl of Lindsey's drainings in Lincolnshire, said, "I say the chief of our opponents be those rich men whom the poor Commoners do petition against for overstocking their Commons, and do oppose us that they may still oppress the poor commoners."

Our notices of these important though lamentable struggles will principally refer to the Fens in Lincolnshire.

The greater part of the general disaffection to the drainage probably arose from the jobbing of the drainers, the unfairness of their demands, the inefficiency of their performances, and the foreign or extraneous origin of the improvement; and perhaps Injustice may have figured in a more rampant manner in these smaller districts than in the larger and, so to speak, more organised Bedford Level. There is, however, a very ample reason why we should speak more particularly of these fens,—though forming a wide district more extensive than the Bedford Level, they are, as we have before said, comparatively little known to the public.

The ready device by which a company of adventurers could obtain possession of a third part or

more of all the estates in the Fens, without the permission of the owners, is explained in most Fen Histories,—the company, promising to drain the country, got the Commissioners of Sewers to tax the lands without the consent of the proprietors: these moneys not being paid up, the Commissioners were entitled by law to bargain with the undertakers for any portion of the lands as a recompense for draining the whole. And, as may be expected, it frequently happened that the drainers, after improving the surface drainage just enough to get the estates adjudged to “them and their heirs for ever,” forgot to repair and maintain the works in proper order. Such a proceeding might well be displeasant to the inhabitants of the Great Level; and many protests were both actively and passively made against it. With regard to the share which Cromwell took in this business before he became Protector, Carlyle says, “There had been in Cromwell’s own Fen-country a work of immense local celebrity going on: the Drainage of the Fens, so long talked about..... This grand work began, Dryasdust in his bewildered manner knows not when; but it ‘went on rapidly,’ and had ended in 1637. Or rather *appeared* and strongly *endeavoured*, to end in 1637; but was not yet by any means settled and ended; the whole Fen-region clamouring that it could not and should not end so. In which wild clamour, against injustice done in high places, Oliver Cromwell, as is well known, though otherwise a most private quiet man, saw good to interfere; to give the universal inarti-

culate clamour a voice, and gain a remedy for it. He approved himself, as Sir Philip Warwick will testify, ‘a man that would set well at the mark,’ that took sure aim and had a stroke of some weight in him. We cannot here afford room to disentangle that affair from the dark rubbish-abysses, old and new, in which it lies deeply buried: suffice it to assure the reader that Oliver did by no means ‘oppose’ the Draining of the Fens, but was and had been, as his father before him highly favourable to it; that he opposed the King in Counsel wishing to do a public injustice in regard to the Draining of the Fens; and by ‘a great meeting at Huntingdon,’ and other good measures, contrived to put a stop to the same. At a time when, as Old Palaceyard might testify, that operation of going in the teeth of the royal will was somewhat more perilous than it would be now! This was in 1638, according to the good testimony of Warwick. Cromwell acquired by it a great popularity in the Fen-country, acquired the name or nickname of ‘Lord of the Fens;’ and what was much more valuable, had done the duty of a good citizen, whatever he might acquire by it.” The infamous duplicity of the “unfortunate” Charles towards the adventurers, and his tyrannical injustice to the Fen population, in grasping at income from acres improved by other men’s enterprise,—are points fully illustrated both in Wells’s and Walker’s Histories. Persons who study the transactions that roused such an uproar in the Fens, will perceive

that the great grievance consisted in the Drainage being done under the authority of a Royal Commission or something of that sort. And the attempt of the King to improve the fen lands without the spontaneous co-operation of the fenmen themselves, had not only all the folly of the late effort to make the Prussian people moral and religious by rigorously enforcing an observance of the Sabbath ; but was combined with iniquitous designs for filching the people's property under pretence of enriching them. The principle of Representation was not so well understood as in the present day ; and the only basis upon which Public works can satisfactorily rest, viz., the goodwill of the Public, was not that on which the undertakings were founded. In modern days, any proposed scheme for Draining on a large scale has to be submitted to the people interested in it ; has to be debated, discussed, cavilled at, and fought about ; monster meetings must be held, evidence adduced before a Committee of Parliament men, and an Act obtained from the kingdom's representatives before a sod can be turned or a brick laid in the matter.

The following is a slight sketch of the draining of the Fens east of the Witham, extending between Boston and the high-lands of Tattershall, Revesby, &c. :—King Charles I., “of his princely care for the advantage of the kingdom,” by letters to the respective Commissioners of Sewers recommended the draining of these lands ; himself being the owner of great quantities of the drowned lands. Accordingly

these authorities (appointed by the Crown,) taxed the country in order to provide a fund for the undertaking; but no payment being made, they contracted with Sir Anthony Thomas for the execution of the work. In four years he was to drain the district, estimated at 45,000 acres, so as not to leave more than 3,000 acres under water; and was to receive a proportion of the recovered ground as his reward. Thus, without the consent of the proprietors of the soil or even the fair compensation of those individuals owning rights of commonage, the King took away a large portion of their property as a recompense for the drainage of the rest.

Sir Anthony accomplished the work (by conducting several new drains to a sluice in the Witham bank above Boston,) sufficiently to procure his allotment; and the remainder was allotted partly to the King and partly to the towns which had interest of Common. In 1645, the commoners, dissatisfied with these proceedings, yet having no legal and constitutional means of expressing their discontent, took arms, broke the adventurers' sluices, laid waste their lands, filled up their ditches, spoiled their corn, and demolished their houses. A complaint was made to the House of Lords, who passed a bill for the relief and security of the drainers, "because of the advantage accruing to the King by the improvement of his lands from 4d. per acre to 10s. or 12s. per acre yearly," and for repaying £50,000. expended by the undertakers. The Commissioners had obeyed the wish of the needy Monarch in

opposition to the inhabitants of no less than 50 towns and villages, or 4,000 families, having right of pasture and turbary in these fens; who now petitioned the House of Commons against the bill. They stated that, by means of many chargeable gouts, drains, bridges, and other works of sewers, they had kept these fens fruitful and profitable ground, so as to be the chiefest part of their livelihood; and that they were never "pestered with beggars and thieves" (as had been affirmed by the drainers) more than in the time of their undertaking. That only East Fen had been hurtfully overflowed; the West and Wildmore Fens being then worth 10s. to 15s. per acre yearly. That the aim of Sir A. Thomas and his participants was to make prize of those lands; and that he had appropriated to himself the ancient drains, clows, sluices, &c., of the inhabitants, without making satisfaction for them. That the drainers had wrongfully taken away £8,000. *per annum* from the Commoners, under pretence of raising £150. yearly fee farm rent for his Majesty's use. That the West and Wildmore Fens were not in any way meliorated by the new works, but worse than they were before the undertaking. And that "equity of disbursements" need not be considered; for the profits of the parts the drainers had enjoyed seven years were (as themselves confessed) £57,000,—which was more than they pretended to have laid out in the works, and many thousand pounds more than was actually expended.—The Commoners gained their suit, and

retained possession of their ancient privileges. The state of the Fens prior to 1800, justifies the petitioners in their assertion that the country had not received an advantage proportioned to the quantity of land taken away.

Our readers will pardon us now, perhaps, if we take them a trip from these Fens to the Isle of Axholme, and show them a few particulars respecting the drainage of that district into the river Trent. Prior to the reign of Charles I., the low lands were for the most part covered with water; and in this and the neighbouring district—where the King had a chase of red deer through a large part “which much annoyed and oppressed the residue,”—we read that no less than 60,000 acres were continually overflowed, so that even in summer the water was 3 or 4 feet deep. Charles, being lord of the Isle of Axholme, Hatfield Chase, &c., to increase his revenue by reclaiming this great quantity of drowned and boggy ground into good meadow, arable, and pasture, contracted with Vermuyden for the drainage of the Level. The work was performed after a fashion in the space of five years, the fresh waters being conveyed into the Trent by sluices which issued out the drain water at every ebb and kept back the tides at their flow. A proportion of land was allotted to the King; and Vermuyden, together with his participants in the undertaking, received a third part of the lands as a recompense,—a company of Adventurers being established for the perpetual maintenance of the works by charges upon their lands. This was

before the Bedford Level drainage was commenced by Earl Francis. The Adventurers' lands were cultivated until the year 1642, when the tranquillity of the Isle of Axholme, like the peace of the whole kingdom, was broken by the outburst of popular indignation. In this case, as in the lamentable outbreaks which occurred in almost all parts of the Lincolnshire and other Fens, (and none of which occurred without a sufficient cause of complaint,) the Commoners taking advantage of the disturbed condition of the realm, sought by riots and tumults to regain the privileges of fishing, fowling, and hunting of which they had been bereft; and the result was the destruction of the drainage-works and the lapse of the country into its original poverty and unprofitableness. The way in which these violent and sometimes sanguinary occurrences were brought about was as follows:—The King being desirous of improving the lands which contributed to his revenue, issued a Commission to certain gentlemen to treat and conclude with those who claimed common of pasture, by way of compensation in land or money; and those who would not agree had an information exhibited against them in the Exchequer Chamber by the Attorney General, and were obliged to submit to his award. There were more than 370 Commoners in the manor of Epworth alone, and a much greater number of persons nearly interested; and of 13,400 acres in that manor, 6000 acres lying next to the towns were allotted to the Commoners as their portion, and the remaining 7400 acres in the

remotest parts of these wastes to Vermuyden and his participants for their third part and for the King's part. This may have been an equitable arrangement; but did not make up for the hardship the Commoners felt, to be compelled to sell their rights and agree to the drainage, no matter what was their opinion as to the benefits they should derive, and this when the number who dissented were more than three times as many as those who were said to have agreed. If the drainers had made the 6000 acres worth as much as the 13,400 had been, instead of making them in a *much worse* condition, then the increased demand for labour upon the remaining portions would, perhaps, have placed the poorer Commoners in better circumstances, and so have mitigated their furious dislike to the drainage; but as part of their land was taken away while the drainage of the rest was obstructed and damaged by the adventurers' works, they were righteously discontented, and fought against the whole scheme as being (what it actually was,) merely a device to cajole them out of their property in order to replenish the Monarch's purse. Even if great advantage had arisen by means of an increased demand for labour, still the boon would have been like a distasteful medicine administered against their will, and while inducing more comforts it would have destroyed their independence, would have reduced them from the freedom of self-maintenance to a state of dependant servitude. Accordingly, when the Parliament itself had set the example of denying

the omnipotence of the Sovereign, the inhabitants insisted on again having their rights of common which had been actually given to them for ever by the Lord of the Manor,—refusing to be any longer bound by the King's decree. In keeping with the manners of the times, this demand was enforced by arms,—they arose in tumults, broke down the fences and enclosure of 4000 acres, destroyed all the corn growing, and demolished the houses. The drainers have recorded that the flood-gates of the main sewers were drawn up, which by letting in the tides from the Trent soon drowned a great part of the low levels in Yorkshire. This was done for seven weeks together, men letting in the tides at every full water and keeping the sluice shut at every ebb tide,—“divers persons guarding the sluice with muskets and saying that there they would stay till the whole level were drowned and the inhabitants forced to swim away like ducks.” Another sluice having been pulled down, the Trent broke down the banks and overflowed the whole level, so that the barns and stacks of corn were flooded to at least a yard in height. This work of destruction, if truly reported, is on too extensive a scale to be considered as mere mischief, and evidences a widely spread discontent among those who had held the rights of commonage. In 1645, the inhabitants of the Isle of Axholme threw down a great part of the banks, and filled up the ditches, putting cattle into the corn and pastures of those who had been adventurers for the draining. A Petition of the

Participants against these outrages states that, after the expenditure of at least £200,000 in those works, the tenants of the Manor of Epworth had laid waste at least 74,000 acres of land, and destroyed a great quantity of rape and corn then growing, by forcibly keeping and depasturing their cattle thereon, also demolished many houses, burnt others, cut and burned ploughs, beat and wounded those who were ploughing or offered them any resistance, and resisted the participants in levying taxes for the repair of the works. Exaggeration may have swelled the actual occurrences into undue importance; but litigation and rioting certainly rendered the Isle conspicuous until the Riot Act was passed in 1715. The incensed portion of the population were both owners and "tenants" or hirers of common rights, and being deprived of their means of living, their aim was to obtain possession of the ancient common, which was their legal inheritance. The whole of the proceedings demonstrate that, however advantageous the drainers may have represented the work to be, the individuals who possessed the first claim to profit would much rather have retained their olden privileges and habits of living; and it is certain that their lands had received a great injury from the drainers' works, while a large portion had been forcibly allotted away from them; and their deprivations (which were not nearly so bad as the drainers represented) were restricted to the grounds which they claimed as their own.

## OUTLINE THE NINTH.

A RURAL RETROSPECT—AGRICULTURAL CONDITION OF THE  
FENS AFTER THE GENERAL DRAINAGE.

Attempted improvements having been succeeded by drainage actually although most unsatisfactorily performed; in what state do we find the Fen Agriculture, and what was the condition of the population? By way of answering these enquiries, it will be advisable to take a previous glance at the kingdom generally during the olden times. We furnish, therefore, a few particulars respecting the progressive condition of the rural population of England, to be borne in mind by the reader when we come to speak more specially of the Fen district.

In the reign of Edward III., it is concluded from manorial surveys, and other documents, that in some places as much ground was farmed as at the present day; and all the extant rolls show that arable land bore a very large proportion to pasture land, in enclosed farms. The price of meat in proportion to that of corn was, notwithstanding, very low, in consequence of the small number of such enclosures. There was a vast extent of Common pasture throughout England, where cattle were fed: the tillage of fields was very imperfect, producing extremely scanty crops; the implements of husbandry were rude; oxen were so badly fed that it required six of

them to draw a plough, which barely turned up half an acre in a summer's day, and these oxen consumed in the winter all the straw of the farm, so that little was left for manure,—these circumstances easily account for the relative dearness of corn. Sixpence an acre was an average rent for arable land in the thirteenth century. The usual amount of produce was about  $1\frac{1}{2}$  quarters per acre.

During the fifteenth century,—marked by the civil war,—there was a great decay of tillage husbandry and population; the former owing in a great measure to the transition from slave to free labour, which had been gradually and unobservedly making way in society, and also to the growth of the woollen manufacture. Proprietors were obliged to convert into pasture those domains which their bondsmen had formerly cultivated; and it was found while the estates of the White and Red Rose parties were alternately wasted, flocks and herds were better adapted than the produce of agriculture to such unsettled times. Inclosures therefore were multiplied, demesne lands extended, and the farms of the husbandmen appropriated to pasture; their houses were demolished or permitted to decay, while a few herdsmen supplanted the yeomen, and occupied, by means of enclosures, the largest estates. Restrictions on the exportations of grain, and the increasing consumption of wool, operated still further to the discouragement of cultivation. The cloth manufactures of England and the Netherlands were in a flourishing state, and by their demand for raw

material enhanced the price of English wool. A system of farming, lucrative but injurious, was thus introduced; lucrative to landowners, but injurious to real industry: its consequences being severely felt, in the beggary and diminishing numbers of the peasantry. Hamlets were ruined, we are told, by oppressive encroachments of the gentry; townships and villages of a hundred families were reduced to thirty, sometimes to ten. Some were desolate, demolished by the avarice of the proprietors; others were occupied by a shepherd and his dog.

The rage for sheep-farming continued during the whole of the reigns of Henry VII. and Henry VIII., so that the arable lands in the reign of Elizabeth were estimated at only one-fourth part of the kingdom. Great miseries were inflicted on the poor by this increase of sheep and extension of pasture land; and individual flocks, which sometimes exceeded, and often amounted to 20,000 sheep, were, by a statute of 25th Henry VIII., restricted to 2,000. This merciful but mistaken piece of legislative interference with trade, of course proved an inadequate remedy; especially as it displayed the partiality of the law-makers by excepting hereditary landholders. It was not until persecutions drove out manufactures from the Netherlands, when the exportation of English wool subsided as its price diminished, that a better system of agriculture was obtained. The landowner, disappointed of his former high profits, discovered the advantage of resuming the plough, and again subjecting his pastures to cultivation.

During the reign of Henry VIII., curious statutes were enacted, allotting for deer parks a certain proportion of breeding mares, the tournaments, &c., requiring that the breed of horses should be sedulously cultivated. These laws enjoined not the prelates and nobles only, but those "whose wives wore velvet bonnets," to have stallions of a certain size for their saddle. The legal standard was 15 hands high in horses, 13 in mares, and "unlikely tits" were without distinction consigned to destruction. These wholesome regulations of a paternal government must have had a profitable and sapient effect upon the agricultural interest, for we read that "asses appear not to have been propagated in England till a subsequent period."

The law of Harry the Eighth against turning arable land into pasture was superseded by an Act in the 39th year of the reign of Queen Bess ordering all ploughed land converted into pasture since the 1st Elizabeth to be restored to tillage, and what was arable not to be converted into pasture. As there was so little enclosed meadow land, as the cultivation of artificial grasses and turnips was unknown, even in the seventeenth century, winter provender was very scarce; hence great numbers of sheep and cattle were killed before they were fat, and salted at the beginning of the cold weather, so that during several months even the gentry tasted scarcely any fresh animal food, except game and river fish. Pigs abounded in the country, roaming about the old forests, and feeding on acorns; and

these, too, were slain and salted for winter consumption. The roots that now smoke on our table, cabbages, carrots, and potatoes, were not generally known.

In commercial cities there was, of course, much more of luxury and splendour than in the country ; but down to the close of the sixteenth century, omitting from consideration the sumptuous entertainments of nobles and corporations, the domestic economy of respectable citizens and artizans was of a very humble character. We may judge of this from their residences ;—there were very few chimneys even in capital towns ; the fire was laid to the wall, and the smoke issued out at the roof or door or window. The houses were wattled and plastered over with clay, and all the furniture and utensils were of wood. The people slept on straw pallets, with a log of wood for a pillow. It is probable that glass windows were not introduced into farm-houses much before the reign of James I. Previously, lattice, horn, &c., were a substitute. The tables of most citizens were furnished with spoons, cups, and a salt-cellar of silver. Spoons and knives were as old as Edward the Confessor, but in Elizabeth's reign the fork was not yet discovered, and at every meal the fingers were used to keep the meat steady and convey it to the mouth. Needles and pins were then coming into common use. In the early part of the sixteenth century, the costume of the wealthy, and in most part the clothing of the poor, were supplied from abroad : silks, velvets, and

cloth of gold were imported from Italy; coarse fustians from Flanders, of a texture so durable that the doublet lasted two years. The home manufactures were woodlens. Over the breeches was worn a petticoat; the doublet was laced like the modern stays, and a frock or tunic descended over the doublet and petticoat, gathered at the middle, and fastened round the loins by a girdle from which a short dagger was generally suspended. This latter garment is correctly represented by the present waggoner's frock. The petticoat was, however, rejected after the accession of Henry VIII. The doublet is now transferred into a waistcoat, and the cloak or mantle has been gradually converted into the modern coat. Female costume was similar to what it is at present. The dress of labourers appears to have been simple and well contrived, consisting of shoes, hose made of cloth, a jacket and coat, buttoned and fastened round the body by a belt or girdle, and a bonnet of cloth. Hats were not much used at that period. In Henry the Eighth's reign, peaks to shoes or boots exceeding 11 inches were prohibited by law to all but gentlemen. The diet of the peasantry underwent few alterations,—their bread-corn being rye or barley, sometimes oats mixed with peas. Wheaten bread was chiefly confined to the tables of the rich. The labourers also obtained bacon in small quantities. The hour of dinner with people of fortune in Elizabeth's time, was 11, before noon; supper between 5 and 6 in the afternoon. Merchants took each of these meals

an hour later, and the husbandmen one hour later than merchants. Our forefathers in the time of Elizabeth paid great attention to their kitchen gardens, and but little to the pleasure garden. For our vulgar “vegetables” were then “newly introduced esculents,” comprising herbs and fruits such as salads, cabbages, turnips, apricots, melons, and currants. Their mode of domestic life may be gleaned from Tusser’s “Pointes of Husbandrie.” The farmer and family’s diet is fixed to be red-herrings and salt fish in Lent. At other times fresh beef, pork, &c. At Christmas,—“good drink, a good fire in the hall, brawne, pudding, and souse, and mustard withal, capon, or turkey, cheese, apples, and nuts, with jolie carrols.” The prudent housewife is advised to make her own candles. Servants are directed to go to bed at ten in summer, and nine in winter, and rise at four in summer.

Rye, oats, and barley formed the staple bread-corn of the common people. This coarse fare formed the principal articles of the national diet until the prosperous reign of George II., when the English began to be a wheat-fed population; but it is thought that at the accession of Geo. III. not more than half the people fed on wheat. For two centuries and upwards the wheaten loaf has been slowly travelling across the island, from the southern to the northern counties; so recently as the year 1800 it had only partially reached Yorkshire, the oaten cake being commonly eaten by the labouring classes of the West Riding: and the same infallible test of

improved popular condition can only just now be said to have fully penetrated into Scotland, and the northern districts of Cumberland, Durham, and Northumberland.

England in the Elizabethan age had become not only a great commercial but manufacturing country ; so that white and coloured cloths, kerseys, bayes, and cottons, were abundantly exported. The Hanse towns had drawn immense quantities of raw wool from this country ; but as the cloth manufactories at home were rapidly growing in importance, the Government—(Oh ! happy English, to have a loving Government always watching over and encouraging trade,)—acting upon the principle of administering a tonic directly the patient exhibits returning vigour, —favoured the new-born industry in 1604 by prohibiting the exportation of English wool.

The manufacturing and commercial interests, having suffered but little by the Cromwellian war, continued in rapid progress ; and consequently, the rents of land were increased, and large tracts of land brought into cultivation. The commerce and riches of England were vastly augmented between 1660 and 1688 ; the condition of the Middle Orders was improved ; but the great body of the people were still deemed of so little consideration, that hardly any details elucidatory of the condition of the Labouring Classes can be found. Wages at this time we know little about. In 1610, the wages allowed by the justices in one of the midland counties to labourers in husbandry, were from 6d. to

10d. a day without meat ; and to women haymakers, 4d. a day without meat. In these ratings the magistrates estimated that half the day's earnings were equivalent to diet for one day, which is a less proportion than would be requisite at present. In 1682 the justices at Bury St. Edmund's fixed a common labourer's wages at 6d. in summer and 5d. in winter, with meat and drink : without rations the sum was doubled.

About this period beef or mutton was  $3\frac{1}{2}$ d. per lb. ; wheat of middling quality was 34s. per quarter from 1606 to 1625. From a list of prices directed to be observed in 1633, we learn that four bushels of the best coals cost 6d., and a pound of the best fresh butter, the same. While such wages and prices continued, it was impossible labourers could purchase in abundance either bread or butcher's meat. They sustained a further disadvantage in the absence of many succulent plants which are now cultivated in the fields. Potatoes, in King James's reign, were estimated a delicacy, whilst tea and sugar were still greater rarities. Tea began to be largely imported in 1637, and in 1660 it was for the first time subjected to the excise, together with coffee and chocolate. It is singular, however, that the duty was imposed on the liquor prepared from these articles, in lieu of the articles themselves ; from which it may be inferred none of these beverages were made by private families, but purchased as spirits are at this day, ready prepared from the compounders. How could our great-great-grandmothers be comfortable without caddies and tea-pots !

Macaulay, describing the state of agriculture and rural affairs in 1685, (the beginning of James the Second's reign,) says, the yeomanry, "an eminently manly and true-hearted race," were "petty proprietors who cultivated their own fields, and enjoyed a modest competence.....Not less than 160,000 proprietors who, with their families must have made up more than a seventh of the whole population, derived their subsistence from little freehold estates. The average income of these small landowners was estimated at between £60. and £70. a-year. It was computed that the number of persons who occupied their own land was greater than the number of those who farmed the land of others."

In those days, the country gentleman "was, as compared with his posterity, a poor man, and was generally under the necessity of residing, with little interruption, on his estate.....His chief serious employment was the care of his property. He examined samples of grain, handled pigs, and on market-days made bargains over a tankard with drovers and hop-merchants.....The litter of a farm-yard gathered under the windows of his bed-chamber, and the cabbages and gooseberry bushes grew close to his hall-door.....His wife and daughter were in tastes and acquirements below a housekeeper or still-room maid of the present day. They stitched and spun, brewed gooseberry wine, cured marigolds, and made the crust for the venison pasty." The clergy also tilled the ground. "Not one living in fifty enabled the incumbent to bring

up a family comfortably. Its children multiplied and grew, the household of the priest became more and more beggarly. Holes appeared more and more plainly in the thatch of his parsonage, and in his single cassock. Often it was only by toiling on his glebe, by feeding swine, and by loading dung-carts, that he could obtain daily bread.....His children were brought up like the children of the neighbouring peasantry. His boys followed the plough, and his girls went out to service." Very degrading, no doubt, but what were the cotemporaneous sufferings of those ministers of religion who were not of the sect "established by law?" "Even in those parts of the kingdom," says the same writer, "which were the best cultivated, the farming, though greatly improved since the civil war, was not such as would now be thought skilful." The rotation of crops was very imperfectly understood. The acreage produce was probably not much more than half what it is now; and according to a computation made in 1696, the whole quantity of wheat, rye, barley, oats, and beans then annually grown in the kingdom was somewhat less than 10,000,000 of quarters, whereas at present an average crop of the same sort of produce is supposed considerably to exceed 30,000,000 of quarters. "Wheat was then cultivated only on the strongest clay, and consumed only by those who were in easy circumstances." The progress of the great changes in agriculture can nowhere be more clearly traced than in the Statute-book. The number of inclosure Acts passed since King George II. came

to the throne (A.D. 1727) exceeds 4000. The area inclosed under the authority of those Acts exceeds, on a moderate calculation, 10,000 square miles, or 6,400,000 acres, equal to nearly ten times the whole of the Great Fen Level. “ How many square miles, which formerly lay waste, have during the same period been fenced and carefully tilled by the proprietors, without any application to the legislature, can only be conjectured ; but it seems highly probable that a fourth part of England has been, in the course of little more than a century, turned from a wild into a garden.”

But if we are not careful we shall be making our “few particulars” of England generally, much longer than our special remarks on the ancient farming of the Fens ; however, we cannot omit a further extract from our modern Historian’s picture of England in 1685. At that period “ the value of the produce of the soil far exceeded the value of all the other fruits of human industry. Yet agriculture was in what would now be considered as a very rude and imperfect state. The arable and pasture lands were not supposed by the best political arithmeticians of that age to amount to much more than half the area of the kingdom. The remainder was believed to consist of moor, forest, and fen. These computations are strongly confirmed by the road-books and maps of the 17th century. From those books and maps it is clear that many routes which now pass through an endless succession of orchards, hay-fields, and bean-fields, then ran through nothing but heath,

swamp, and warren. In the drawings of English landscapes made in that age for the Grand Duke Cosmo, scarce a hedgerow is to be seen, and numerous tracts, now rich with cultivation, appear as bare as Salisbury Plain. At Enfield, hardly out of the smoke of the capital, was a region of 25 miles in circumference, which contained only three houses and scarcely any inclosed fields. Deer, as free as in an American forest, wandered there by thousands. The fox, whose life is in many counties held almost as sacred as that of a human being, was considered as a mere nuisance. The wild bull with his white mane was still to be found wandering in a few of the southern forests. The badger made his dark and tortuous hole on the side of every hill where copse-wood grew thick. The wild cats were frequently heard by night wailing round the lodges of the rangers of Whittlebury and Needwood. The yellow-breasted marten was still pursued in Cranbourne Chase for his fur, reputed inferior only to that of the sable. Fen eagles, measuring more than nine feet between the extremities of the wings, preyed on fish along the coast of Norfolk. On all the Downs, from the British Channel to Yorkshire, huge bustards strayed in troops of 50 or 60, and were often hunted with greyhounds. The marshes of Cambridgeshire and Lincolnshire were covered during some months of every year by immense clouds of cranes. Some of the races the progress of cultivation has extirpated; of others the numbers are so much diminished that men crowd to

gaze at a specimen as at a Bengal tiger, or a Polar bear."

Whilst all the great changes in the agricultural condition of the kingdom, the rise and decline of sheep-farming, oppressive enclosure of open fields, &c., were going on, the Fens, we believe, had continued in much the same state. The better portions were tilled and reaped by fat abbots and their pious dependants; the wetter grounds frequented by fishers and fowlers, and infested with robbers and marauders who, secure in those lone retreats, lived by nocturnal plundering of the upland borders. There are several reasons why the agriculture of the Fens should have remained pretty much in an unvarying condition. Being chosen for the site of numerous religious houses at a very early period, the cultivable parts of the Level were reduced to husbandry, and, being farmed by the monks, who did such good service to agriculture wherever they might be placed, soon surpassed in productiveness and good management any other spots of equal extent in the kingdom. But when other lands became improved and cultivation rapidly extended on every side, these were prevented from such an extension by the encompassing waters; and until the general draining we cannot suppose that any material alterations occurred.

Doubtless, the villanes continued for ages to labour here as elsewhere for their lords, being "allowed two loaves of bread daily, besides a certain portion of flesh, and abundance of ale." Serfs and cattle formed the

living money ; the price of a slave being quadruple that of an ox. By the time, however, that Henry VII. came to the throne, the race of villanes was almost extinct ; the people had in a great measure escaped from feudal bondage, and wages were nearly quadruple what they had been in the preceding (or 14th) century. One circumstance certainly calculated to affect the farming of the fen country was the total suppression of the monasteries, chapels, chantries, &c., by that somewhat off-hand monarch Henry VIII. For the Fens not only bred pestiferous diseases, but superabounded in most magnificent abbeys, cathedrals, nunneries, churches, &c., which, like whitened sepulchres, were indeed, beautiful outward, but within were full of all uncleanness,—pollution so gross as to put that most decent modest prince to the blush. What were the rural effects of this great sweeping of the “besom of destruction” we do not know ; but though the public thus obtained an insight into relics, impostures, miracles, and the sanctity of their proprietors and exhibitors, they did not relish the change from jolly hospitable monks to “bad bishops ;” and 20,000 men of Lincolnshire, headed by the abbot of Barlings, made complaint and rebelled.

Among various facts tending to show that Fen farming at an early period was in advance of that of the kingdom generally, this is one,—after the accession of the Tudors, the culture of Flax was attempted to be “introduced into this country,” but without success ; whereas both hemp and flax were

regularly cultivated in the Isle of Ely two hundred years before. The district in which these plants were chiefly grown was around Upwell and Elm near Wisbech, the land being much better situated for drainage than many other parts of the fen. It suffered occasionally however from the disastrous inroads of the sea that so frequently overwhelmed Marshland. In the latter district, thousands of acres of corn, pasture, and hay, were frequently inundated with several feet depth of water, in consequence of the failing of barrier banks. The same kind of calamity often desolated the towns and villages along the Lincolnshire coast, destroying their crops and live stock, and sometimes the houses and inhabitants. Holinshed, in his *Chronicles*, gives some graphic statements respecting some of these deluges; and from the amazing extent of land covered by the violent waters, and the multitudes of animals drowned, we can evidently form no conception of the distress and destitution which were thus suddenly brought upon the population.

Gentlemen's "seats" do not abound in the Fens, and we need not be surprised to find that but few noble mansions were erected amid the swamps before the General Drainage. Large farm-houses, however, clustered on the higher grounds; the produce from the fens being carried to the village homesteads. This arrangement exists to some extent even at the present day; very few farm-yards and houses in some localities having been yet built on the fen land.

Our task now shall be that of assisting the reader to pourtray in his own mind the fen-husbandry of the period immediately following the General Drainages, viz., the latter part of the seventeenth century. Now if we successively take away the various excellencies of modern agriculture until it becomes stripped of all the improvements it has acquired since the time of which we write, we may obtain perhaps an adequate sight of what it anciently was. Thus, when we remember that under-draining, bone-manuring, guano, ridge-culture, four-course-system, two-handled ploughs, drills, cake-breakers, corn-crushers, horse-hoes, thrashing-machines, Leicester rams, improved short-horns, &c., have been mainly invented or brought into play since 1800, what wretched earth-scratchers and miserable herdsmen and flock-masters do we make of our great-grandfathers. And if farm practice were generally so backward and unskilful fifty years ago, how rude and barbarous it must have been a hundred years before that.

Many districts, for years after the general drainage, continued badly drained, untilled, producing coarse and scanty fodder, and generating endemical disease. On the "hards" or islands in the fens (as we have before said,) lived many cottagers, both proprietors and hirers of commonage. They were chiefly dairymen, stocking the commons and fens all summer with their cows, which they kept in winter on hay stored from the grounds allotted as "mow fens." Their chief subsistence was fish and fowl,

together with milk, butter, and cheese, and bread made from the spring corn which they grew in small patches. For fuel they used peats, dug in the "turf fens" and dried; a week's work providing firing for the whole year. But the reader himself must apply the facts we have given to the particular state in which he already knows the Level to have been. He must imagine the rustic population we have described to have lived upon the bordering high-lands and in the Fen towns; and beside these he must suppose a wilder race of fishermen and fowlers,—rude, amphibious men, wading through plashes on stilts, trapping waterfowl in nets, skimming the broad and reedy meres in boats, stalking over morasses with leather breeches, leggings, and jack-boots, and journeying annually to Sturbeach Fair, at Cambridge, to purchase the requisite clothing for their families.

A petition of the chief inhabitants and freeholders of Wisbech, Newton, Leverington, Tid Saint Giles, Elm, Upwell, &c., presented to the House of Commons in 1699, states "that the said towns and country adjacent for ten miles in compass, consisted for the most part of pasture, marsh, and fen lands, the produce whereof was mostly employed in feeding of cattle, and for butter, cheese and summer crops of oats; and that the petitioners being supplied with wheat, rye, and malt from other countries, (especially from Bury and the parts of Suffolk adjoining,) by way of return, experienced great inconvenience for want of navigation to and from

thence, their interchangeable supply became very chargeable, and in winter, by the badness of the way, impracticable." The petition prayed for an Act to make the river Lark navigable. This shews that even these good parts of the Fen were too dropsical for wheat-growing,—only spring corn being attempted. Wheat was sown on the high-lands or "hards" within the Level.

Sir William Dugdale, in the preface to his "History of Imbanking and Draining," published in 1652, speaks of the benefits accruing from the Fen Drainage in these terms,—" Next, for the richness of the soil, being gained from the waters, doth it not, for the most part, exceed the high grounds thereon bordering, as much as other meadows do, which are ordinarily let for 20s. the acre?..... Moreover, besides the great plenty of flesh and white meats, with the breed of serviceable horses, let us consider the abundance of wool, hides, tallow, and other commodities, which this fruitful ground now produces; and that the new channels made for the draining do yield no small advantage to all those parts, for the carriage of their corn and merchandize; whereas before, they were constrained to go many miles about, according to the natural bending of the rivers.—And if we weigh the great inconveniences which these overflowings have produced, certainly the advantage by the general draining ought the more to be prized; for, in the winter time, when the ice was strong enough to hinder the passage of boats and yet not able to bear

a man,\* the inhabitants upon the hards and the banks within the Fens, could have no help of food, nor comfort for body or soul; no woman aid in her travail, no means to baptize a child, or partake of the Communion, nor supply of any necessity, saving what those poor desolate places do afford. And what expectation of health could there be to the bodies of men, where there was no element good? the air being for the most part cloudy, gross, and full of rotten harrs; the water putrid and muddy, yea, full of loathsome vermin; the earth spungy and boggy; and the fire noisome, by the stink of smoky hassocks.—As for the decay of fish and fowl, which hath been no small objection against this public work, there is not much likelihood thereof; for, notwithstanding this general draining, there are so many great meers and lakes continuing, which be indeed the principal harbours for them, that there will be no want of either; for in the vast spreading waters they seldom abide, the rivers, channels, and meers being their principal receptacles. And that both fish and fowl are with much more ease taken by this restraint of the waters within such bounds, we daily see; forasmuch as all nets for fishing are better made use of in the rivers and meers, than when the waters are out of those narrower limits; and that decoys are now planted upon many drained levels, whereby great numbers of fowl are caught,

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\* The Fens have produced some sturdy and lightning-like skaters.

than by any other engines formerly used; which could not at all be made there, did the waters, as formerly, overspread the whole country."

In 1653, upon a complaint being made that the land was "as much worth before the draining, in reed and sedge, as since," an estimate was formed of what that year made,—when but about 28,000 acres of the fen grounds in the Bedford Level were drained and made use of, being sown with coleseed, wheat, barley, oats, and flax. These crops were grown by the gentlemen adventurers, and not by the common farmers of the district. Among other items, this valuation reckoned,—Every acre, for hassocking, barning the hassocks, ploughing, burning the sward, and sowing with coleseed, cost £1. Every acre of seed, wheat, barley, or oats that were sown, being near 10,000 acres, cost in seed 8s. per acre. The reaping, threshing, and carriage of cole-seed to be fit for the boats, cost £3. per last. And the produce was far above 5,000 lasts of coleseed, and above 1,000 of wheat and other grain, which gives a yield of about eight bushels per acre.

A "Narrative," published in 1685, says that most of the commons out of which the adventurers' 95,000 acres were taken, "are (by the country) lately divided and enjoyed as Severals to particular owners and commoners of each respective towns to which those commons belonged. And others finding that such division and cutting of the commons proved a great waste of ground, and the fences hard to be kept, and great diminution of stock, and decay

of houses, many selling their lands from the same, to the increasing of the poor: therefore they would not divide, but have by agreement decreed in Chancery the same by way of a Stint to feed the same, every house alike; so that in some towns there is above 2,000 milch cows, besides a great running stock fed thereon, *viz.*, Cottenham, Chatteris, March, Wimblington, Manea, and other towns, to their great improvement and enriching." Good farm management was not to be expected in such a situation. The improvement of live stock seemed all but impossible, from the wretched state in which they lived, or rather starved, upon the wild and swampy commons, all selection being prevented by the mingling together of all sorts of cows with a variety of bulls (belonging to numerous proprietors,) in one great herd: how utterly at variance with our modern practice of breeding and box-feeding on scientific principles! The higher grounds lay in wide open wastes, overrun with weeds and rubbish, rushes and thistles;—the lower parts were frequently flooded: and in some of the clay fens the fields are still intersected by frequent hollows and dikes, which were anciently thrown out as receptacles for the water, and the soil raised into large mounds as places of retreat for the cattle. But the unenclosed lands of deep peat presented the most dismal spectacle: being drowned nearly all winter, and during the rest of the year covered with reed-plashes, rough hassocks, and cotton-grass; they were areas of loose bog, the residence of snipes, bitterns, wild

ducks, and herons, where cows and horses were mired and lost, and their skeletons found when the drains were cut.

The business of the larger occupiers and land-owners was chiefly grazing; but on the gradual improvement of the drainage, and the inclosure of the commons towards the close of the last century, most of the land became converted into tillage. Thus, though the poorer cotters had to part with their cows, the simultaneous progress of inclosure and extension of arable culture occasioned a greater demand for labourers: work was more plentiful, wages rose; the gunning-boat and fish-net were relinquished for the plough and spade, and the improving farms soon brought ample remuneration to the masters and a more comfortable subsistence to the men.

Wherever the "turf" or peat moor is found, it has afforded a means of livelihood to a large class of people, who have, from time immemorial, been engaged in cutting, drying and carrying it to the towns and villages, where it is bought for fuel. Peats or "cesses" were formerly used for fuel over many of the neighbouring counties; and a project was at one time formed for supplying the metropolis with Fen firing. Another useful commodity produced by the fens is the reed. Beds or shoals of reed, now seen only on the shores of the meres, formerly abounded like plantations in many parts of the country. Great quantities of these tall reeds were reaped like corn in the latter part of the

summer, dried, dressed and sold in bundles for thatch ; this covering, it is said, making cooler houses in summer and warmer ones in winter, than any other roofing material. In some districts a considerable trade was once carried on in supplying the large markets with wild fowl. These were taken in “decoys” (vulgarly called “duck-coys,”) but in later years, with the waters have disappeared also the birds. Geese, in some localities, were considered the fenman’s treasure ; large flocks, even of a thousand each, were kept, and were frequently plucked, as their feathers and quills formed valuable articles of commerce. In earlier times, too, there were numerous and extensive salt works on the marshes along the east coast of the Wash, and also more inland, upon the margins of the different havens.

The reader must excuse the want of “arrangement” observable in these “sketches ;” for we are not professing to compose a regular and connected history. The fragmentary information we have adduced is only intended to assist the reader’s imagination in setting before his mind’s eye the great plain of the fens with its farms, drains, and desolateness. And our work will perhaps be more lively in consequence of dancing from one topic to another.

By the petition referred to a few pages back, we see the privations accompanying an absence of good means of communication. Roads for facilitating conveyance are of the greatest importance to commerce ; and are almost the first step in social

improvement, without which there can be neither security nor traffic. The Fens, particularly after the Drainage, possessed numerous navigable canals, by which heavy goods and agricultural commodities were transported between the high lands, the fen towns, and the sea; but the upland counties had no such convenience. Roads they could boast of, superior to those of the Fens because harder and drier, but still of a wretched order. In the reign of Mary a general Act was passed for the mending of highways,—surveyors being appointed, and every parish, by four days' labour of its people, compelled to repair its own roads. This was a very efficient measure till the vast extent of population and trade in the reigns of the Stuarts rendered necessary a more general system. In the reign of Charles I. a proclamation was issued for preserving roads by limiting the weights to be drawn over them. This inefficient remedy gave way to turnpikes in the reign of Charles II.; but for nearly 100 years after the first introduction of turnpikes, they do not appear to have been generally available for travelling or the conveyance of merchandize. The first turnpike road was established by law in 1653, through Hertfordshire, Cambridgeshire, and Huntingdonshire. Nothing, however, of importance was done to raise the character of English highways till after the peace of 1748. Down to the middle of the last century, a great part of the internal trade of the island was carried on by pack-horses, the roads not being passable for a cart or other wheeled carriage.

A line of horses, the first having a bell, conveyed through long winding lanes a large part of the woollen manufactures of the West Riding of Yorkshire. A gentleman of Manchester sent the manufactures of the place into Nottinghamshire, Lincolnshire, Cambridgeshire, and the intervening counties; and principally took in exchange feathers from Lincolnshire and malt from Cambridgeshire and Nottinghamshire. All his commodities were conveyed on pack-horses. His balances were received in guineas, and were carried with him in his saddle-bags. In Lincolnshire he travelled chiefly along bridle-ways through fields, where frequent gibbets warned him of his perils, and where flocks of wild-fowl darkened the air. Arthur Young, who travelled through the southern and northern counties of England in 1770-2, found in Norfolk that there was not "one mile of excellent road in the whole county." In Yorkshire, the roads were execrably bad, "yet," he says, "the people all drink tea." In 1706, the stage-coach from York to London was four days on the road; and in 1763 there was only one coach once a month from Edinburgh to London, and it took from 12 to 14 days to perform the journey.

With modern improvements in Drainage the Fens have also obtained good and serviceable roads; no turnpike roads in the kingdom exceeding many of those which have been substituted for the old ways of clay and silt.

**OUTLINE THE TENTH.**

BEGINNING OF MILL DRAINAGE—IMPROVEMENT OF THE WITHAM—STATE OF THE SOUTH LINCOLNSHIRE FENS—PERAMBULATORY VIEW OF THE DISASTERS OF BEDFORD LEVEL IN THE EIGHTEENTH CENTURY—EAU-BRINK CUT.

By means of the new works executed at the General Drainage, the natural rivers were carried in a direct course into their former estuaries,—"held forcibly aloft in strong embankments, for twenty straight miles or so ; not left to meander and stagnate, and in the wet season drown the country as heretofore." The fen waters, therefore, combined with the hill streams, ran partially off by their own natural descent to the sea ; but the peat earth, being thus in some degree dried, became contracted and compressed, and the whole surface of the black land sunk several feet, so that the relative levels of land and sea were considerably altered, and the drain-water was more reluctant than ever to flow into the deep. The outfalls still remaining unscoured and unrepaired, were the scene of an incessant conflict between sluggish fresh-waters going out and great tides, thick and muddy with silt and sand, coming in. The result there was a constantly augmenting accumulation of deposit ; and this, choking the river mouths, together with the above-noted diminution of fall, occasioned frequent drownings of the fens and

a generally bad state of drainage. This provoked another drainage-fight; but the great army of fenmen fought against the water in the weakest and worst way: Instead of uniting together and driving out the grand enemy at the general outfalls, they each fortified their own property against floods by embankments, (often to the injury of each other,) and scooped out the water from each inclosure with a windmill; not considering that unless the means of conveying the waters to the sea were improved, their "poldered" lands would quickly be in as disastrous a state as ever.

The sluice upon the Ouse at Denver was blown up by the waters in 1713, and the old river having no back-water, quickly silted up, so that the waters could not return off the South Level with any quick motion, but "strained through the reeds as through a sieve;" and could not grind out the sands. In January, 1723, a survey was made, when this Level was found inundated to a great depth,—the low-water mark in the river being more than a foot higher than the soil. At that time several draining mills had already been built,—Badeslade, writing at that date, says, "As the Fens are thus overflowed.....the revenue of the adventurers' taxes raised upon the 95,000 acres, to maintain the works of draining, and pay their officers' salaries, is proportionably diminished; and was it not for a great number of the landholders throwing the Fen waters over banks into the rivers and drains, by engines made at their own expence, they say the whole body

of the Fens would become unprofitable, and taxes enough could not be raised.....”—The earliest account (we believe,) of the erection of a wind-mill for drainage, after the example of our Dutch neighbours, is one stating that an engine was erected at Tid St. Giles in 1693 or 4, at a cost of £450. It drew off the water from 2,400 acres in Tid and Newton parishes,—the account speaking also, at the same time, of “Leverington old mill.” Acts of Parliament were soon after obtained for private district drainage,—the first in the Bedford Level being for “Haddenham Level,” in 1726. It was not long before the system was universally adopted; each estate, or united estates, being embanked all around to exclude neighbouring floods, ditches made to empty themselves into a “mill-drain” terminating near a river, and upon the bank of this a windmill erected, which, by means of the water-wheel, dashed the water out of the mill-drain up an ascending curve into the high-riding river.

The undertakers of the Deeping Fen Drainage had accomplished little in the way of drying the surface, yet the adventurers’ lands were inclosed, and taxes levied upon them for preserving the works. In consequence of wet seasons and a bad drainage, the proprietors of the taxable lands had taxes to pay, but received no rents; and being therefore in arrears, more than half of the lands were sequestrated and sold. They were, in 1729, conveyed to Captain Perry for £4,000. to be laid out in works. In 1741, two Dutch engines were erected,

one on each of the main drains, having water-wheels of 16 feet diameter, with 13-inch ladies. Between 1740 and 1747, upwards of 40 engines were erected on the respective farms in Deeping Fen. The above-named engineer fitted one of the larger mills with an Archimedes screw, which answered for a time, but grew out of repute; and to his credit it may be noticed that he attempted the deepening of the Welland channel in its estuary below Fosdike, employing many workmen to dig and barrow out the sands, though the tides "filled it up as fast as they took it out." The land was freed from inundation during a part of the year, and continued until the beginning of the present century a region of grazing farms and open commons, producing "exceeding store of grass and hay."

The fens in Lincolnshire bordering the river Glen, Hammond Beck, and the Witham, were brought into culture in several parts, but again reduced to watery wildness. Few records of their condition before 1700 have been preserved; but judging from their subsequent history, we may suppose a large portion of the land to have been summer grazed by mean cattle and unhealthy sheep, mown for rough fodder, cropped with reed, and in winter boated for fish and wild ducks and geese. The air must have been loaded with fog; the shallow waters crowded with pikes and frogs, and their surface white with cranes and herons. The inhabitants were uncouth as their stock and untamed as the fowl, engaged in draining, fishing, and duck-shooting,—living miser-

ably, and perishing with fever and ague. The marsh districts were in a better plight,—the sluices in the sea-banks evacuating a portion of the drain-water and leaving the rich feeding grounds to be grazed in summer by shaggy long-woolled sheep and raw big-boned oxen; being visited, however, with occasional inundations of the tides, which wrought incredible mischief.

The Witham Fens consisted of immense lakes and pools of shallow water, which, during a great part of the year, formed almost “one uninterrupted and boundless extent of restless roaring waves.” These waters contained large quantities of fish, as well as, at certain seasons, abundance of wild-fowl of every description. Some of these fens were overgrown with reeds and saw-leaved “shards,” amongst which the coot and other birds used to breed in great numbers.

The Black Sluice Drainage District running northwards from Deeping Fen, and having its ancient natural outlet by means of the Hammond Beck, Risgate Eau, and various “lodes” and sewers discharging into the Witham river and Bicker Haven, was partially improved in 1638. At that time Robert, Earl of Lindsey, cut a drain following about the same course as the present South Forty Foot; but no permanent amelioration occurred until the construction of the new Witham channel. About the year 1720, the North Forty Foot Drain being excavated in Holland Fen, vast quantities of water were discharged into the Witham just above Boston, which used to enter through the Langrick Sluice

higher up the stream. In consequence of this and similar diversions the river became landed up by the sediment of the tides. Its bed was soon so completely obstructed that there seemed to be no remedy but the cutting of a new channel and erecting a sluice at Boston; and accordingly an Act for these purposes was procured in 1762. The "Grand Sluice" was opened in 1766; and the contemporary works comprised the execution of a new cut from this sluice to Langrick and onward to Chapel Hill, a total length of about ten miles, embanked on both sides. This new canal straightened as well as opened the course of the river, which had previously pursued a meandering course of more than fourteen bends, highly prejudicial to the drainage. From the upper end of the cut inland to Lincoln the commissioners had to "cleanse out, widen, deepen, and embank, the river," which labour was completed in 1788; the sum of £60,450 having been expended upon the works. This money was levied by rates and taxes on the lands draining by the Witham, and by tolls and duties on the navigation. The Witham Act made provision for the drainage of 100,000 acres, which it divided into six districts; but several of the works contemplated by the Act were never executed. A portion of the country being deprived of its old Langrick outfall and without any new drain to replace it, was compelled to turn its drainage in another direction: an Act was therefore obtained in 1765; when the South Forty Foot, 21 miles in length, was cut, the "Black

Sluice" erected upon its outfall at Boston, and several old drains improved. Great advantages immediately resulted from these works : many thousands of acres found a vent for the downfall waters and hill floods with which they had been long saturated.

Holland Fen, a district of 22,000 acres, lying between the South Forty Foot and the Witham, was drained and inclosed under an Act passed in 1767 ; Heckington and Helpringham Fens, with some smaller wastes, were reclaimed at about the same time ; and an immense tract was thus brought into valuable pasture and corn ground which before this was frequently under water for several weeks together between Boston and the hills, the inhabitants traversing the flood by means of boats. Prior to the opening of the new Witham in 1764, and indeed for some time after, the whole country from Lincoln to Bourn was often deluged by the expanding waters. The floods covered the entire surface from Boston to the high lands near Heckington, from Kyme to Tattershall ; and on the north side of Boston, from Frith Bank to the northern hills.

A poetical writer, who lived in Kyme Fen about half a century ago, graphically describes the country thereabouts : he says,—

" Twixt Frith Bank and the Wold side bound,  
I question one dry inch of ground :  
Now, let me well be understood—  
I speak as bounded by the flood.  
From Lincoln, all the way to Bourne,  
Had all the tops of banks been one,  
I really think they all would not  
Have made a twenty acre spot."

The same "water poet" again says,—

"Near the Garwick milestone  
 Nothing there grew beneath the sky  
 But willows scarcely six feet high,  
 Or osiers barely three feet dry;  
 And those of only one year's crop  
 The flood did fairly overtop.  
 By Kyme and the Six Hundred banks,  
 Previous to inclosing pranks,  
 Looking due north, saw nothing dry  
 Till Tat'sel Castle caught my eye:  
 The last time I was on that way,  
 From recollection took survey,  
 And found one hundred yards of line  
 My boat and milestone would combine."

He adds, "I have times out of number seen cows loosed out of their hovels, and swim across a river, with nothing but their faces and horns above water, and then take footing at mid rib deep, or less, but not one spot of dry land, and then forage till weary, and return to their hovels in the like swimming position. No place whatever was more famous for this than Chapel Hill, which I have known for a long continuance of years, previous to cutting the new river Witham, or to speak more fully, opening the Grand Sluice, inaccessible but by boat or riding horse belly deep, and more in water than mud. I have also known in the whole parish of Dockdyke not two houses communicable for whole winters round, and sometimes scarcely in summer; which was in some measure the case of all the water-side quite up to Lincoln. We used to carry the sheep to pasture in a flat-bottomed boat, clip them in ditto, and afterwards fetch them away in the same conveyance."

The East, West, and Wildmore fens, a tract of about 40,000 acres lying north-east of the Witham river, still continued as hazy regions of boggy forage-ground and dreary swamp. In 1793 it was estimated that 40,000 sheep, or one per acre, rotted on the three fens. Nor was this the only evil, for the number stolen was incredible: so wild a country nursed up a race of people as wild as the fen, and the sheep were often taken off by whole flocks. Arthur Young, visiting Wildmore fen at the close of the last century says,—“Whole acres are covered with thistles and nettles, four feet high and more. There are men that have vast numbers of geese, even to 1000 and more.....There may be five sheep an acre kept in summer on Wildmore and West fens, besides many horses, young cattle and geese; if there are any persons who profit, it is those people who keep geese.....Upon driving West fen in 1784 there were found, 16th and 17th September, 3936 head of horned cattle. In dry years it is perfectly white with sheep.....In East fen are 2000 acres of water.....Sir Joseph Banks had the goodness to order a boat, and accompanied me into the heart of this fen, which in this wet season had the appearance of a chain of lakes bordered by great crops of reed, *arundo phragmites*. It is in general from three to four feet deep in water, and in one place, a channel between two lakes, five to six feet. The bottom a blue clay, under a loose black mud, two to two and a half feet deep.....In both East and Wildmore fens the

poor horses, called Wildmore tits, get on the ice in winter, and are *screeved*; that is, their legs spreading outward, the wretched animals are split." In another place he mentions "an ingenious and very simple tool in use in East fen," viz., a sledge for going on the ice. "It is a small frame," he says, "that slides on four horse bones, the driver pushing himself forward with a pitch-fork."

These notes will sufficiently indicate the nature, aspect, and agricultural management of these low lands: we may, however, add that about 6000 acres of the lowest and wettest fen, viz., the East fen, were water or shaking bog, the water from four to six feet deep, standing in pools from 60 to 600 acres in extent, and abounding in fish and wild fowl. About 300 acres belonging to the parishes of Wainfleet and Friskney was denominated the Mossberry or Cranberry Fen, from the quantity of cranberries which grew upon it. The soil there is a deep peat moss, on which *Empetrum* (Crowberry or Crakeberry,) and several other mountain plants were found, though in no other part of the fens. So abundant were the cranberries, that in some years when the season was favourable, as many as four thousand pecks were collected, but the average quantity was two thousand. Drainage, however, has now destroyed this gain, and also another source of profit, viz., the Decoys. London was principally supplied with Ducks, Widgeon, and Teal, from the Decoys in East fen and some other districts. In one season, a few winters prior to the inclosure of

this tract, ten Decoys, five of which were in the parish of Friskney, furnished the astonishing number of 31,200 for the markets of the metropolis.

But we must quit these northern fens and—requesting the reader to *imagine himself living in the last century*—proceed at once to see what can be done for the Bedford Level,—lying still in winter floods and summer's cold evaporation: for though we have set up a few windmills to abate the distresses of the fenmen, the great outfalls we have still left uncleansed. Let us penetrate into the depths of this melancholy country, survey the inundating waters, and discover that remedy which at a later period

“Made their flowing shrink  
From standing lake to tripping ebb, that stole,  
With soft foot towards the deep.”

Vermuyden's works have opened a somewhat direct line of conveyance for carrying the waters from the surrounding high country over the Fens to a point many miles short of the sea; the low lands are secured from the high-level water in his new cuts only by soft embankments through which the wet oozes, the rats bore, and the waves raised upon the bosom of his “reservoirs” incessantly wear. The General Drainage was executed upon principles fundamentally wrong; great men employed themselves, not in obtaining an outfall, as they ought to have done, but in constructing large drains and high banks within the boundaries of the Fens, expecting the water to force its own passage in spite of every impediment. This not proving to be

the case, ingenuity was then set to work to invent engines for the purpose of throwing the water off the lands into the internal rivers. Still it does not find its way to the sea; but overtops the banks, or breaks them down by its increased hydrostatic pressure. What then is being done?—(we are supposed to be speaking fifty years ago,)—why, instead of resorting to the outfall, we are augmenting the size of our engines, and raising our banks, so that the water which, had there been an outfall, would have found its way to sea, or, if left to itself, would have rested on the lowest of the land, has been forced in a retrograde motion over the surface of the higher and more inland fens. Has no one then proposed a wiser scheme? Yes: in 1720 Charles Kinderley pointed our attention to the main outfalls; insisted upon the folly of letting the Ouse bend in a horse-shoe course for seven miles through shifting sands and shallows more than a mile wide, when a direct channel for three miles between Eau Brink and Lynn Harbour would discharge with greater fall and velocity; and advised that the Nene below Wisbech should be carried in a straight cut through the moveable silts and bare marshes of the estuary, confined by embankments to a narrow channel for about two miles seaward. By these methods the Fen drainage might have been lowered several feet; but several inconsiderate engineers and many unreasonable people, with the obstinate Corporations of Lynn and Wisbech at their head became enamoured of a specious but egregious

blunder : to them the expanding estuaries were not obstructed by growing bars which retarded and enfeebled the current of fresh water, preventing thus the scour of foul channels ; but contained fair marshes and grateful shoals which, receiving an impetuous indraught of tide every twelve hours, patiently emitted the same, thereby maintaining clear channels for the rivers. Consequently they "opposed" the scheme : unable to crush or overthrow it, they served as blocks to clog it ; damaging and endangering the whole Bedford Level for thirty long years more, and provoking from keener observation and more vexed and wide-spread discussion, completer plans and more noisy demands for improvement. In 1751, Nathaniel Kinderley, son of the former engineer, proposed a plan worthy of a real genius. A part of it was the cut between Eau Brink and Lynn, with another through the marshes below Lynn, into deep water ; he proposed a cut from Wisbech to Lynn, that all the waters of the Ouse and Nene might be united ; a fourth, from Spalding, through the marshes and by Boston, also, into deep water, uniting the waters of the Welland and Witham,—the consequence of which would be the avoiding all the shifting sands of the river estuaries, and draining so much of the Wash as would amount to more land than the whole county of Rutland. Every one of his cuts was proposed on the principle of avoiding broad channels with shifting sand-banks, and confining the rivers to narrow channels, in order to insure depth by force

and weight of current. This noble idea has not yet been executed; and even that small fraction of it called the Eau Brink Cut is now, at the beginning of another century, struggling for our suffrage, and promising to save us from the floods which are threatening to overwhelm, drown, and destroy us. Truly this dread of deluge paralyses our industry; our families, property, and effects being at the mercy of the weather, and liable to be overflowed in windy weather at any moment. Listen to the facts of our deplorable case. In 1770 the whole of the North Level was laid seven or eight feet deep under water, by a great breach in the Nene barrier bank 130 yards long and 36 feet deep; and in 1795, all the other banks gave way. For the last thirty years, many inundations have taken place, and lately with increasing power and immense mischief. Local Acts of Parliament have been vain and nugatory, but the burden of taxes immense. In 1749, over a great district, 1s. 6d. an acre was laid on; in 1772, 3s. added; and in 1798, above 150,000 acres paid 5s. an acre upon inundated lands. In the year 1795, no less than 140,000 acres in the Middle and South Levels only were flooded, viz., 58,000 acres by the unevacuated downfall water, and 82,000 acres by "slips" in the banks from the accumulation of water in the drains and rivers; and much about the same quantity was flooded in 1799 and 1800, by downfall and breaches in the interior banks,—three of which breaches in the parish of Whittlesey cost about £500 repairing.

More than 25,000 acres, to the south of the Hundred Foot Drain, were under water until May, 1800. An eye-witness, speaking of that year, says,—"It was a melancholy examination I took of the country between Whittlesea and March, the middle of July, in all which tract of ten miles, usually under great crops of cole, oats, and wheat, there was nothing to be seen but desolation, with here and there a crop of oats or barley, sown so late that they can come to nothing. Of wheat there is not an acre. The grass itself is very much damaged; producing, where mown, miserable crops of sedge instead of good grasses; and where fed, keeping very little stock, and that badly. Yet the average rent of these ten miles is 14s. an acre; and the landlord has a heavy drainage tax to pay of 5s. an acre, and in some districts 7s.,—sunk for security but repaid by inundation." The Eau Brink Cut Act has passed (in 1795); but the expenses of obtaining it were upwards of £11,900, and its promoters cannot raise the funds for carrying it into execution. The first partial Outfall improvement has been for years accomplished upon the river Nene: a cut has been carried through the green marshes below Wisbech, beginning about five miles from that town and terminating at Gunthorpe Sluice,—a length of 1½ miles of straight and clean channel having been added to the river at an expense of £10,000. It is called "Kinderley's Cut;" though only about half the length designed by that engineer in 1721. It was completed in 1774, greatly im-

proving the drainage of the North Level, and all the lands draining the Nene; having permanently lowered the low water at Wisbech more than 5 feet, and facilitated the navigation to that port. But notwithstanding this successful example, the Ouse still wanders among its varying sands and stagnates on its reedy shoals; and the great scheme for improving the Welland outfall, for which an Act has been passed (in 1794), is delayed,—in consequence of the scarcity of money arising from the war. Meanwhile, ruin overwhelms our Fens: the inclosures of the upland country, the waters of which are discharged upon us, increase every year; the rivers and cuts in the Level are silting up; a greater portion of the land is either under water, or but lately freed from inundation; the outfalls are unimproved and rapidly lessening in capacity for discharge; if nothing be done the whole country will be lost; and the Act is already passed, which, if executed, would cure evils that have cost us (in loss of produce) millions,—and that Act a dead letter for want of ability to procure £70,000. See what has resulted from a want of scientific system in draining an immense Level like this: an extraordinary number of Acts of Parliament have been passed during the last 150 years, constituting a vast variety of general and local powers, with the power of taxation for their support; the sums raised, not short, perhaps, of £100,000 a-year, for effecting the drainage, &c., have impoverished the landholders because of the miserable drainage they obtain for

their payments ; and now, when an extra effort is required, to cleanse out the grand obstruction, we are incompetent to make it. Here is a field for Reform ; here are misdirection of means, mismanagement of finances, fanatical tory adhesion to olden though suicidal systems of policy. Engineers perceive the errors, suggest radical alterations ; and Ignorance and Prejudice forthwith scandalously abuse them,—thousands upon thousands sterling being mischievously flung away, nay, even some new works demolished, by what politeness itself must denominate the furious clamour and pig-headedness of town corporations. And now, just entering upon the nineteenth century, the Eau Brink Cut not yet begun, in what condition do we find the different districts ? Look at the fens of Ramsey and Whittlesea ; a tract of water, sedge, and frogs, which thirty years ago was in a state of cultivation, producing ample crops over hundreds of acres. Holm Fen, all under water ; where, twenty years ago, were buildings, farmers, and cultivation. Talk of Agricultural Advancement, History of Drainage Improvements, &c., but what Era in Fen Progress are we to call this ? This will surely be a wretched chapter for our posterity to read : while the world is striding onward, our steps have been retrograde. And wherefore is this ? Why have not the innovators, the “radical reformers” in drainage been able to quench opposition,—radicals who, whatever such characters may be in politics, have always proved the true *conservatives* in drainage matters ?

Most likely, we reply, because the needful measures, viz., of opening outfalls and deepening the internal rivers must be general and comprehensive. If local and individual effort could suffice, remedial works would have been done; witness for analogy the speed with which the mill-system was adopted. Say what you will, the farmer is but little speculative or philosophic, and is prone to be beguiled by immediate effects rather than by distant, though capital results: he eagerly fenced his own plot, and framed a windmill (notwithstanding its being a *machine*.) to lift out his floods, for he saw the advantage with his own vision; but organization was to him reticulation,—the resultant action of the half-thousand engines, the composition of all these hydraulic forces, the relation of his mill to everybody else's, the connection of all these with each other, the importance of the great arterial streams to his little farm-drain which, with myriads more, intersected the vast body of the Fen like capillary veins,—these things were complicated matters of calculation, excursive thought, conflicting opinion; they were to be found in books, and must be learned by the teaching or testimony of others: this kind of knowledge seemed therefore too troublesome, too far off; and hence General Plans were a long time in taking possession of his mind. Had the suffering agriculturists been of a different temperament, the opposing interests would have been vanquished at a far earlier date; and it was only the scene of watery wreck and dismay, the blasted produce, withered fortunes,

reduced trade,—a spectre-like array of disasters staring upon them from all sides, that finally terrified them into harmlessness and minority.

Look at Holm Fen; and where is your patience to witness land in such a drowned and pestilent condition, while the nation suffers for want of food? “Three years ago,” writes one, “five quarters of corn an acre; now sedge and rushes, frogs and bitterns! remove the water, bring fire in its place and vast crops of cole and wheat would re-assume the land.” “In Draper’s delph lives or rather swims, William Fletcher, a labourer, with a wife and three children. During the summer of 1799, they could live below stairs but one month, the water was so deep on the ground floor; all last winter it was two feet deep, and they have not been down stairs yet, but to get to their boat, which brings them to and fro; the water is now (July) in the house after this dry season. For this habitation they pay two guineas a year. This family lives within one hundred yards of half a last of coleseed per acre. Such contrasts are incredible to a person who was never in the fens.” In the month of July, 1800, and after an uncommon drought, a tourist in the Bedford Level saw not less than 70,000 acres which were so lately under water, that the spring crop was lost, and the damage to an immense amount.

The breach of banks, in 1795, inundated 25,000 acres in Downham and Littleport districts, much of it six feet deep; and three breaches in the south

PERAMBULATORY VIEW OF BEDFORD LEVEL. 169

bank of Morton's Leam, from Wisbech to Peterborough, flooded 10,000 acres at the same time. In 1799, the Littleport, &c. district had the same misfortune, the water on an average  $3\frac{1}{2}$  feet deep, and it lay nearly twelve months in that state. In the same year Middle Fen, between Ely and Soham, containing 14,000 acres, was deeply flooded. In both these inundations, larger tracts of the Middle and South Levels (though not very deep in water,) were so wet as to prevent sowing and feeding, than were at that time left dry. During the whole of the winters preceding those floods, both of which happened in February, the Hundred-foot and Whittlesey Washes (or reservoirs,) were two or three feet deep in water, and consequently afforded so much less room for the waters poured in from the highland counties. This would not have been the case had the Eau Brink Cut existed. The water of those washes was frozen to the ground, on which came fresh floods; so that at last the ice in some places was twelve or thirteen feet thick: it was the floating ice of these loosening floods that did the mischief, and thus the terrible breaches would not have occurred had there been an unimpeded outfall.

Whittlesea Mere, the chief inland lake of the Fens, occupying about 1,500 acres near the inland border of the Level, serves (we are supposed to be speaking at the commencement of the present century,) as a receptacle not only for the descending hill waters, but often for those also which are raised

off the fens of Ramsey, Whittlesea, March, &c. As so many drains from the Middle Level fall into the Ouse at about the same point where they meet the drainage-water of the South Level, viz., at Salter's Lode, near Downham, they are unable from the pressure of other floods to discharge: the water, therefore, reverts into the Mere, and there being able to spread, and find, as it were an easier level in that spacious surface than by rising over the banks, the banks which bound the drains are preserved. When Whittlesea Mere fills; and, at the same time, the gates of the Tongs Drain (or Marshland cut, conducting these waters into the Ouse,) cannot, from the height of the flood, be opened; with full 500 mills of increased powers at work, emptying into the rivers; when these circumstances unite, the banks must give way. And they often do unite, and as inclosures in the high country increase this may be expected still more frequently. There is no way of preserving this great and fertile country if the Ouse outfall be not much improved. The Eau Brink Cut must be made; and all the main drains completely scoured. As a proof of the latter assertion, there is a fact of great importance; in May, 1800, when the waters, after a flood, had sunk at Salter's Lode four feet, they had fallen in Whittlesea Mere only six inches, owing to the insufficient depth and breadth of the drains. An observer states respecting the floods, that, in 1795, Messrs. Edes & Nicholls, of Elm, near Wisbech, "lost 200 acres of wheat: when Waldersey, March, and

Whittlesea fens were all under water, 5000 acres in Waldersey, and much more than 20,000 in all; the water stood two feet deep in Mr. Nicholls's parlour." It is easy to put down the figures, but difficult to form an idea of the loss and distress involved in the deluging of many thousand acres of cultivated ground. Think of the 200 acres of wheat; then think of large farms, then of estates, then of estates congregated into districts, then of several wide districts, stretching beyond the ocean-like horizon on every side, with all their pasture, cattle, crops, fold-yards, ricks, farm-houses, cottages, manor-halls, villages,—and you will begin to eye with sympathetic consternation the numerous items of acreage-floodings which have been recorded. Desolation has swept the Great Level more frequently than it was wont to do because of the new inclosures in the upland districts, discharging rapidly into the fen rivers the waters which, in open fields, rested on the land till evaporated, or passed off by very impeded currents. Those lands being drained, the rain falling on them runs off as quickly as every means can accelerate it, so that at St. Ives and other places, the floods on the Ouse meadows are more sudden than formerly,—eight hours of heavy rain bringing a flood. And inundation is also more frequent because the interior of the Fen district has subsided to a lower level by the various efforts made to drain it, by cuts, mills, and every contrivance, and consequently become lower than it was formerly in comparison with the bottoms of the drains or rivers.

The Fens, therefore, require improvements in the outfalls and a deepening and enlargement of the main sewers, proportioned to the additional rapidity with which they receive the upland floods and to the subsidence of the surface. The bed of the old Nene is as high as the land it runs through, and this is likewise the case of other rivers, occasioned by the sluggish streams not being capable of grinding the bottoms, and also by the quantity of sullage thrown into them by the mills.

Picture the bankruptcy arising from such a drainage, or rather such a drowning: it would be a loss to dead-fallow one field of so rich a soil; how much more then to have your whole farm without a crop; and not by this holiday rested and renewed, but so sterilized, impoverished and soaked that the succeeding season is also lost, none but the most courageous farmers daring to sow spring corn, and that too late to be remunerative. No wonder that the land fluctuates here so extraordinarily in value. A farmer in 1800 states that he has a farm under the Hundred Foot bank, near Downham Market, of 293 acres, which was sold for £800, then for £900, next for £1000, then it was mortgaged for £1200. After this it was sold by auction for 400 guineas, but the purchaser did not take it; and this farmer then bought it for 200 guineas, and in prospect of a speedy completion of the Eau Brink Cut would not take £1500 for it. An observant visitor in the Fens, before the Cut had been commenced, states that "Land is now to be purchased at from £4 to £10 per

acre, which, under secure drainage, would sell readily at from £20 to £30. Two or three more floods will do the business, and 300,000 acres of the richest land in Great Britain will revert to their ancient occupiers, the frogs, coots, and wild ducks of the region."

But we have been long enough in floundering about the "water-logged" Level: we will open the Eau Brink canal, let the waters escape, and then —after a glance at other topics—proceed with a description of the farming wherever subsiding floods left it possible.

In the spring of 1808, thousands of acres were overflowed, banks were burst, sluices blown up, and the Bedford Level damaged to the amount of "at least one million!" Prevention better than cure, is a maxim seldom influential in John Bull's public matters.—Necessity, there with him, is the sole mother of Invention; and it was only when Fen Agriculture was within a gasp of dissolution, that something serious began to be done. Mr. Rennie, who had been most successful (as we shall hereafter see,) in draining the Fens north of Boston, was called upon to make a survey and form a plan for the general drainage of the Bedford Level. Applying his giant powers to embrace the whole subject, he gauged and levelled the Fens, found that they were all higher than the sea at low-water and might therefore be dried without mills, and enunciated a grand scheme comprised in what Messrs. Walker and Craddock fitly denominate "one of the most

comprehensive Reports which has been proposed for the relief of the Levels." The plan may be briefly described as insisting on the making of the Eau Brink Cut as a preliminary necessity, and then surrounding the whole fen with "catch-water" drains,—or drains skirting the uplands to intercept the rapid freshes or "living" waters and convey them separately across the flat. The two Bedford Rivers were to be converted into one by a drain carried through the middle of their Wash, from Mepal to Denver, and the reservoir itself thereby drained. A new cut was proposed from Whittlesey Mere in lieu of the Old Nene and its extensions, and continued thence to the Eau Brink Cut, and a drain carried to the like point from Grunty Fen. This great design was never carried out, for the estimated expense of upwards of a million sterling was an object almost as appalling to the fenmen as a second flooding. In 1818, however, the Eau Brink Cut was begun: Telford and Rennie being engineers, and Sir Edward Banks contractor for the work. This canal,  $2\frac{1}{2}$  miles long, was opened in 1821, just 26 years after the Act had been obtained for it; and it was widened in 1826, a bridge being erected over it near Lynn. Shortly after its opening, the low-water mark at its upper end fell between 4 and 5 feet; subsequently 2 feet more, and continued to fall until it reached its maximum of 7 feet. The sills of Denver Sluice (through which the Old Ouse flows at its junction with the Hundred-Foot,) were laid 6 feet lower, and a corresponding improvement was felt

over all the immense tract of low lands in the Middle and South Levels. This benefit was made available to the former Level by a complete deepening and enlarging of all the chief rivers and sewers, under the authority of the "Middle Level River Act," passed in 1810; the needful funds being raised by a shilling tax per acre on certain of the lands.

## OUTLINE THE ELEVENTH.

SUPERNUMERARY SKETCH OF THE PROGRESS OF AGRICULTURAL SCIENCE, WITH A PLEA FOR AGRICULTURAL LITERATURE.

Leaving the Nene and Welland Outfalls still unnoticed, we ask favour of our readers while we enter upon some farming observations; and as all pictures have their "accidents,"—some alas! their offences,—we trust that our digression may be regarded as an illustrative incident accompanying the main group of objects in our historical painting of the Great Level.

To what point had Agricultural Science advanced in the eighteenth, and commencement of the present century? We begin our answer with a quotation from the introductory essay in Morton's "Cyclopædia of Agriculture," written by Mr. C. Wren Hoskyns. The lectures on the application of Chemistry to the aid of Agriculture, delivered to the Board of Agriculture by Sir Humphrey Davy between 1802 and 1812, may be fairly regarded as the starting-point of its present course. "Interesting as its previous career may be to every liberal mind as matter of historical curiosity, it can scarcely be regarded with higher practical estimation, in point of utility, than that in which we should hold the mechanical arts before the introduction of steam

power, navigation before the mariner's compass, literature before the invention of printing, or 'war before gunpowder.' The birth of chemistry—a science which unfolds the laws and structure of all the material substances of our planet, its atmosphere, the constituents of its productions, and the phenomena of their *growth*—must obviously to any reflecting mind afford an epoch from which all analytical progress in agriculture must take its date. Whatever previous causes may have retarded its advancement, and whatever local or temporary circumstances may have operated in its favour, its practice must in either case be merely empirical, so long as its elementary and governing principles were in fact unknown." Before the end of the seventeenth century, the cultivation of Green crops on the *alternate system* had made some progress in the southern counties of England; but the investigation of the PRINCIPLES OF FERTILITY, the basis and groundwork of all purely agricultural speculation, seems scarcely to have been the subject of a continued experiment. Works, however, had been written by the learned, touching this subject, in a strangely conjectural manner. Evelyn's "Terra," published about the beginning of the eighteenth century, was one of these; of which the following passage from an edition of 1778, is a specimen:—"Those who have written, *de arte combinatoria*, reckon up no fewer than *one hundred and seventy-nine millions one thousand and sixty* different sorts of earths: but of all this enormous number, as of all other good

things, it seems they do not acquaint us with above eight or nine eminently useful to our purpose; and truly I can hardly yet arrive at so many. Such as I find naturally and usually *to rise from the pit*, I shall here spread before you [the Council of the Royal Society.] in their order. The most beneficial sort of mould or earth, appearing on the surface, is the natural under-turf earth; but for a description of the rest which succeed it in strata or layers till we arrive at the barren and impenetrable rock, I shall refer the critical reader to the old *Geoponic* authors."....." My Lord Bacon directs to the observation of the rainbow, where its extremity seems to rest *as pointing to a more rosed and fertile mould*; but this, I conceive, may be very fallacious, *it having two horns or bases which are ever opposite.*" Every school-boy that has heard anything of "simple bodies" in Chemistry and "formations" in Geology, can now smile at the learned member of a scientific society a hundred years ago, who was ignorant of the main constituents of soil, and seems to have supposed all the strata to be alike in every place.

Before Chemistry arose to the help of Agriculture,—before the genius of Davy and Liebig guided her experiments and explained her practice, there was one experimentalist who originated a vast change and revolution in farm management, and "may perhaps be called," says Mr. Hoskyns "the greatest individual improver that agriculture ever knew." This was JETHRO TULL. "His theory was that roots of plants live upon *minute particles of soil*: and the

practice to which it led him was that of repeated tillage and pulverization during the growth of the crop. To effect this the more thoroughly, and at the latest periods of growth, he adopted the plan of sowing the seed in rows at wide intervals ; the awkwardness and even purposed carelessness of his workmen, he tells us, drove him to the invention of some instrument by which the seed could be delivered in regulated quantity and without deviation : "to that purpose," he writes, "I examined and compared all the mechanical ideas that ever entered my imagination, and at last pitched upon the groove, tongue, and spring, in the sound board of an organ. With these a little altered, and some parts of two other instruments added to them, as foreign to the field as an organ is, I composed my machine. *It was named a DRILL*; because when farmers used to sow their beans and peas into channels of furrows *by hand*, they called that *action drilling*." The width of the interval between the rows as thus planted, easily suggested the substitution of the HORSE-HOE for hand-labour ; and "it is thus worthy of remark, that in the instinctive prosecution of a principle which he never fully comprehended, two of the most valuable of modern implements of agriculture fell by that collateral necessity which great truths bring with them, to the invention of a man whose humble modesty of nature, and light appreciation of his own discovery, did not save him from the common fate of the benefactors of mankind." This farm was situated at a place called Prosperous, in a

tract of "very indifferent" land, lying on the north side of the Hampshire hills. His principles and practice are to be found in his work entitled,—"New Horse-hoeing Husbandry; or, an Essay on the Principles of Tillage and Vegetation; wherein is shown a method of introducing a sort of Vineyard Culture into the Corn Fields, in order to increase their Product, and diminish the common Expence by the use of Instruments, described in Cuts," 1783. The recently announced method of growing wheat year after year with a yield of 50 qrs. per acre, without manuring, is only a modification of Tull's husbandry; and forms a striking testimony to his genius and the value of his discoveries. One quotation from Tull will show that the farmers in his day were worthy ancestors in prejudice, and inactivity of mind, of some few in modern times. The introduction of Green and Root crops, we have alluded to: the introduction of the Clover crop, which may also claim to form one of the epochs in agricultural practice, was about the middle of the 18th century,—the rural works of that date advising white clover to be sown also *with other grass seed*. Tull says, in the notes to his preface, 1749,—"The sowing of artificial grasses was so long before it became common among farmers, that Mr. Blythe wrote of it in Cromwell's time; yet thirty years ago, when any farmer in the country where I live was advised to sow clover, he was certain to say, 'gentlemen' might sow it if they pleased; but they (the farmers) *must take care to pay their rents*,' &c.

if the sowing of clover would disable them from paying it : and now the case is so much altered, that they cannot pretend to pay their rent without sowing it, though the profit of it is vastly less since it has become common, than before ; and the improvement, after all, was no more than doing the same thing on this side of the water that was done before on the other.

East Lothian slowly adopted the Tullian husbandry before it was common in England ; and Northumberland was first to follow the example. The whole history of Scottish agriculture from 1780, previously far behind the southern and eastern parts of our island, is probably unmatched for rapid improvement in any “old-settled country.” The Highland and Agricultural Society commenced in 1784 ; and in England the Board of Agriculture was formed in 1793, under the presidency of Sir John Sinclair, and the secretaryship of the well known ARTHUR YOUNG. This master of agricultural literature wrote the “Farmer’s Calendar,” “Farmer’s Letters,” and several “Tours ;” he edited the famous “Annals of Agriculture,” and was the author of some of the County “Surveys” undertaken by the Board. In all his writings he seems eminently to have kept in view his own remark, “What we want is a *Book of Experiments*. What we have are the author’s reflections, instead of that which enabled him to reflect ; and from which we might draw very different conclusions. *The Experiment is the Truth itself*: the author’s conclusions,

matter of opinion which we may either agree to or reject according to our private notions."

The Board discontinued its valuable exertions in 1813; and the Royal English Agricultural Society, established in 1838, is prosecuting its most useful labours in the publication of Essays and County Reports, and in the Annual "Great Exhibition" of Agricultural Mechanism and Breeds of Live Stock. Until these Institutions were founded, little was publicly known of the cultivation prevalent in different localities, or indeed of the principles and methods of farming anywhere; but practical farmers have now begun to write their experience, or tell it to inquiring authors, and the public journals abound with agricultural information. And while farm facts and statistics are being promulgated as data for invention and improvement, Science is contributing truths and principles which give birth to new processes and are silently renovating our art. Botany, Animal and Vegetable Physiology, the sciences concerned with Air, Water, and Steam, Mechanics, Meteorology, Chemistry, and Geology, in their turn pay tribute to this both ancient and infantile profession, "holding out the means of progressive instruction, only limited by the ability of the agriculturist to avail himself of their resources until it has become more and more apparent, that scarcely any knowledge is superfluous to the tiller of the soil."

Chemistry, we have said, the parent of our newborn agricultural theory and speculation, gave its

first teachings through the instrumentality of *Davy*: another name must be mentioned in relation to another science, viz., WILLIAM SMITH, the father of English Geology. He ascertained that the English strata, down to the coal measures, have a regular and invariable order and succession, and a general dip towards the east; and that each group of strata is characterised by a peculiar group of organic remains. He was also the first to point out the distinction between those regular strata and that loose covering of sand, gravel, and clay (now denominated Drift,) which is so generally distributed over the surface. In 1815, he published his great work,—a Map of the Strata of England and Wales, and part of Scotland; followed by several County Geological Maps. As the distribution of soils depends upon the geological beds beneath, "no agricultural maps," says Mr. Trimmer, "such as those appended to the Reports of the Board of Agriculture,) which only exhibit, and that imperfectly and on a very small scale, the variations of the surface, and neglect those of the substrata contained in the detrital deposits and in the still deeper solid strata," could exhibit the true agricultural relations of a county, district, or even estate. To Smith, therefore, we are indebted for laying the foundation of that knowledge which classifies our soils, describes their characteristic properties, points out the agricultural influence of the subjacent earths and rocks, discovers fertilizing beds of clay, marl, and other substances, and valuable fossil manures,

which furnish the ready means of correcting mechanical and chemical defects in the composition of the soil and subsoil.

From the earliest periods the injurious effects of wetness in a soil have been always painfully felt in the untractable state of the land and the loss of manure. Stagnation of water being the disease, it was conceived that anything that would get rid of it would be the remedy. Hence arose "lands" or "stetches," with furrows for carrying off the water. "It was clearly decided *nem. con.*," said C. W. H. in the *Agricultural Gazette*, "that the clouds were in the wrong for sending so much rain, and that the earth in lying level was lying under a mistake." Still the retentive lands continued wet and cold; and as a relief for the excessive moisture and a means of fertilizing the soil, SUBSOIL DRAINAGE was discovered. Captain Walter Blith, in his "English Improver, or a New Survey of Husbandry," published in 1649, forcibly advocates a deep under-drainage, of which he was most probably the inventor: "make thy drayning trenches deep enough, and I'le warrant they drayn away that under moisture, fyld, and venom that feeds the rush, the flagg; and the mareblab, and then believe me, or deny Scripture, which I hope thou darest not, as Bildad said unto Job, 'Can the rush grow without mire, or the flagg without water?'" Again.—"But for these common and many trenches, oft-times crooked too, that men usually make in their boggy grounds, some one foot, some two, never

having respect to the cause or matter that maketh the bog; I say, away with them as a great piece of folly, lost labour, and spoyle." He describes the use of deep-covered drains, placing at the bottoms of the trenches good deep faggots, willow, alder, elm, or thorn, or "in firmer stuff pebble stones or flint stones, and so fill up the bottom of thy trench about fifteen inches high, and take thy turf and plant it as aforesaid; the green sound downwards, being cut very fit for the trench, and then having covered it all over with earth, and made it even as the other ground, waits and expect a wonderful effect through the blessing of God." He prescribes also the "driving the drains right up and down the fall of the land;" but he proposes no systematic plan of thorough-draining generally wet and retentive soils. Drainage was in those days restricted to directing the water of springs into proper channels, and hindering them from forming into marshes; and as Flaming flourished during the Commonwealth, and the above original Essay passed during that period through three editions enjoying an extensive circulation, it is probable that a great extent of land was improved by this means. Indeed, the modern drainer often meets in his diggings with antique hollow-drains, tallying with the descriptions of that period. In the year 1764, Elkington, a Warwickshire farmer, began to drain his wet fields that occasioned the rotting of his sheep. He did not apply himself simply to the confining and conveying away of the water after it had reached the surface;

but was led by a happy accident to invent a system of *tapping springs*, by means of boring-tools he probed the ground to the source of the spring, and took the water out of its former course; nor by piercing the impervious bed beneath the boggy spot, let the water pass off through a porous stratum below it. In 1835, Mr. SMITH, of Buxton, asserted his principle of Thorough or Frequent Draining; and "we heard in England," observes Mr. Pusey, "that a manufacturer in Scotland had found the means of making all land, however wet and poor it might be, warm, sound, and fertile, and that this change was brought about by two processes, thorough draining and sub-soil ploughing;"—now embraced in the suitable term, *Deanstonizing*. His rule of draining was this: that we are not endeavouring merely to find out hidden springs, and to cut them through by a single drain, which in some of our books appears to be regarded as all that was necessary; but that, as the whole surface of retentive soils is wet, not by accidental springs, but by the rain, the whole surface of the field must be made thoroughly dry by under-drains, running throughout at equal distances; any field, he said, however wet, might be so dried, provided these under-drains were cut sufficiently near each other. This was a novel idea; but as there is no new thing under the sun; it was accidentally discovered by Mr. Pusey, and by him declared to the public in 1843, that it had been generally practised in Essex, Suffolk, Norfolk, and Hertfordshire for a

whole century, — some estates having been drained 40 years back with drains only twelve feet apart, and fully three feet in depth. Thorough-drains had therefore mellowed and aerated large districts of clay-land in those counties before Elkington discovered the system that won him renown. "And the Deanston plan of drainage was, "regarded as novel," says Mr. Pastyoff, yet had been employed and established, for a century at no great distance from London; and this is by no means a singular proof how little the farmers in one part of England knew, until lately, what the others were doing." Had the agriculturists been a reading class at that time, possessing numerous papers and magazines, the success of such an extraordinarily important operation would have been instantly known throughout the remotest provinces; and there would have been scarcely a necessity for an apostle of drainage to agitate the kingdom in its behalf.

With respect to the progress of agricultural Mechanics up to the early part of the present century, we must offer only a few words, or our fair readers will think we have completely wandered out of their country. That venerable implement, the Plough, — probably much more than 2000 years old, and still imperfect, — has appeared in a marvellous variety of shapes, light and cumbersome, simple and complex, since the days of the Anglo-Saxons; when, in one part of our island, a law was enacted that no man should undertake to guide a plough, which could not break one. From a rude sketch

given in a Saxon M.S., it seems that our Saxon forefathers were wont to fasten their oxen to the plough by their tails; a barbarous custom, which was certainly practised with horses in Ireland so lately as 1684, when the legislature interfered by an Act entitled "An Act against plowing by the Tayle, and pulling the Wool off living Sheep;" the latter custom was yearly done instead of clipping or shearing the animals. Until the 17th century, the plough was generally drawn by oxen. Many "modern inventions" were found out at a very early period: Worlidge, in his "Mystery of Husbandry," (A.D. 1677,) describes very clearly the first attempt to construct a *subsoil plough*,—"an ingenious young man of Kent had two ploughs fastened together, by which he loosened, lightened, and stirred up the land twelve or fourteen inches in depth." But for ages the plough was little more than a rude clumsy implement, which served only to tear up the surface of the land sufficiently deep for the seeds to be buried; and did not at all answer the purposes now required until the close of the 17th century. The origin of our most useful instruments and discoveries now common to all mankind is at an immense distance behind our remotest historical investigations; —the first ploughs we know of in this country were rudely constructed, intolerably heavy, and of all kinds of shapes: beyond this we know little; but Jethro Tull, who searched into the early history of this implement, concludes that it was "found out by accident, and that the first tillers (or plowers) of

the ground were *hogs*." Carlyle says, "Has any Useful Knowledge Society discovered who it was that first scratched earth with a stick; and threw corns, the biggest he could find, into it; seedgrains of a certain grass, which he named *white* or *wheat*? Again, what is the whole Tees-water and other breeding-world to him who stole home from the forests the first bison-calf, and bred it up to be a tame bison, a milk-cow?.....Are not our greatest men as good as lost? The men that walk daily among us, clothing us, warming us, feeding us, walk shrouded in darkness, mere mythic men." The Dutch were amongst the first who brought the plough a little into shape. In the middle of the 18th century, James Small, a mechanic of Berwickshire, improved upon the Dutch model, driving out all the umbrous implements then used in Scotland; whilst in England the Yorkshire swing plough (the Dutch somewhat altered in form,) became general in most counties. The plough generally used in the Fens at the commencement of the present century is thus described in Young's Survey of Lincolnshire:—"It much resembles the Dutch paring plough of the Cambridgeshire fens; the mould board of a good sweep; the throat, a segment of an ellipsis; and the form of the share of great merit, always well steeled and sharpened with files; the coulter, a sharpened steel wheel." A note adds—"they turn all their land over with two horses, double or parallel to each other, and in this business many of them are very clever, and will make their furrow as

straight as a line ; and by laying your head so low on the bottom of it, that your sight is confined by the sides, you may see down it to the further end, which is in some not less than a quarter of a mile in length." There was also a one-handled plough in common use ; but if these are to be found at all at the present time, it must be in the form of "fossil remains." A box and wheel was also attached, for drilling beans upon the centre of the preceding furrow ; and the barrow-drills were likewise in use. The "skeith" seems to be peculiar to the lowland districts, being found many years ago in our own fens and in the Isle of Axholme ;—it was an invention probably imported from Holland or France. It formerly consisted, as at present, of a small wheel or disc of iron, sharp at the periphery, and running level with and close to the plough-share ; and is much better adapted for cutting stiff soil free from stones, and ploughing amongst stubble and twitch than the sword coulter. An expanding horse-shoe with a pig's-head share in front, and side knives or cutters, and an expanding ridge-harrow following,—was invented at Brothertoft, in Holland Fen, (Lincolnshire,) by William Amos author of several valuable agricultural works between 1794 and 1804. At that time "Drilling-machines" were beginning to pervade the Fen district as well as the high lands ; and thrashing-machines were employed in some localities. Spiked rollers were seen here and there ; and scufflers and twitch-drags began to traverse the fields, tearing the soil with their

grinning iron teeth. Turnip-cutters were made, which sliced the turnip by forcing it between knives by a block and lever, or chopped it with vibrating cutters. Rotary chaff-cutters appeared on some of the more important farmsteads, in place of the old ones with a sliding straight blade. Thistles were not only mown or spudded in hot weather, but were gripped by "tweezers" when the pastures were moist, and drawn up by the roots. Thrashing machines began to be employed, to the great annoyance of the flail-men. The vehicles were heavy two-horse carts, lumbering single-and-double-shaft waggons; and the light, narrow-wheeled fen waggon, made with a pole like a coach, so that either a pair or three or four horses could be attached.

We started in our digression by considering the point to which "agricultural theory" had attained about 20 or a few more years ago: and we must just mention a few more of the multitudinous benefits conferred upon the business of farming by the discoveries of science. Chemical Analysis revealed the constituents of soil and of crops; hence we could infer in a great measure what substances are abstracted by vegetation from the land, and thus learn the most suitable manures to apply for restoring that matter lost by the exhaustion. Analysis has told us that the rain and the atmosphere contain some of the ingredients removed from the producing soil, and thus we learn the necessity of under-drainage to fertilize as well as temper the land. Chemistry also shows us that the bulk of cereal

produce depends upon the amount of ammonia in the field; and that this again may depend upon the quantity of nitrogen supplied to our manure-making animals. Hence we learn the best means of maintaining the natural fertility of our farms. "Ammonia," says Chemistry, "is volatile; therefore make your manure under cover, and use absorbent earths that you may fix the precious ethereal. Collect the drainings of hovels and stables,—the liquid abounds in fertility. Warmth and rest are, to some extent, equivalents for food; infer from this fact the best means of fattening your stock."

Botanical discoveries, the acclimatation of foreign plants, researches into the diseases of plants, and many other branches and enquiries of science have rendered great service to agriculture. Meteorology has assisted in the work of cultivation by showing the influence of temperature, moisture, the seasons and the weather upon soil, vegetation, and animals; and has proved of inestimable advantage to the engineer and farmer in the essential operation of drainage,—especially in the lowland districts and the Fens, where the amount of rain falling and the quantity evaporated at different times of the year become data of the utmost importance in calculating and designing the works requisite for conveying away the surplus water.

In rising for a time above the level of the Fens and issuing abroad into collateral subjects, we have well nigh expanded our "sketches" of the fen flat into a spacious panorama of "things in general;"

but we cannot refrain from adding a few remarks in connection with Agricultural Literature.

"How can he get wisdom, that holdeth the plough, and glorieth in the goad, that driveth oxen, and is occupied in their labours, and whose talk is of bullocks?" Such, in ancient times, was the exclamation of the Hebrew sage; and the same enquiry may again be demanded of the present age with a similar hopelessness of solution. It may refer with great truth to the farmer himself;—not solely to the fagging labourer who "giveth his mind to make furrows, and is diligent to give the kine fodder." Education has been wofully misappreciated by the master, & not simply by the working men, of whom we may too often say with sorrow,—

"Mill penury repressed their noble zeal,  
And froze the genial current of the soul."

It is true to some extent that "the wisdom of a learned man cometh by opportunity of leisure, and he that hath little business shall become wise." But leisure alone will not suffice. Leisure for study is not so much needed by agriculturists as a perception of the value of knowledge and an inclination to possess it. Do not lectures, discussions, and public periodicals figure somewhat diminutively in their hands? While the charms of the chase, the glories of game, and the perfection of their beasts of sport form too often an absorbing topic at market meetings and convivial gatherings—are not the revelations of science, the birth of new truths, and the great questions which concern the welfare of humanity,

comparatively neglected or discarded? Are farmers generally considered as "readers?" do not the cheering glass and comfortable pipe, or the desultory fireside conversation engross too many of the evening hours? We may have several useful agricultural magazines and papers, but these are mainly supported and purchased by the more opulent farmers and landowners; and, as a proof how little the great bulk of the farmers read of agricultural information, where, we ask, are our farmers' Penny periodicals circulating their 10,000 per week? Yet, were the farming public to crave for such a supply of knowledge, it would be instantly forthcoming.

Farmers repeatedly complain of the unpractical nature of communications in their journals:—why do not the objectors themselves write "practical articles?" The fact is, "practical" farmers are in general too unfamiliar with the pen to take the greater portion of the rural journalism out of the hands of the amateur cultivator and man of science. The lawyer and physician seem to possess more favourable opportunities than the farmer for studying the "theory" of their professions, because their business is much amongst books and papers, and they cannot acquire an adequate knowledge of their *practice* without reading; whereas farm operations may be directed without the aid of written information. The "learned" professions discover past theory in books of cases, &c., (perhaps we might say *cases* of books); the farmer finds it in the modified

farm practice of the day. The habits of reading and writing are intimately connected with the one variety of pursuits, and widely severed from the other: hence the lawyer and medical man are accustomed to rest their belief and knowledge upon recorded facts, and observations reduced into principles, while the tillers of the ground are chiefly influenced by improvements performed before their eyes. But if we "cerealists" (as the *Times* newspaper styles us,) were more educated in youth, and more studious through life, (we are speaking of the farmers *en masse*, great and little,) what an impulse should we give to the great science of Agriculture, what fundamental laws and trustworthy formulæ of practice would be educed and established! Removed from that "mental attrition" which sharpens, warms, and stimulates the residents in towns, the more isolated agriculturists are only beginning to learn that the Press can assist them in their art;—hardly yet longing to be made acquainted with discoveries in the natural sciences that, like manufacturers, they may seize upon some, and avail themselves of such assistance for inventing new methods of production. Yet if there be any truth in chemical and geological science, Cultivation will progress in proportion as the principles and facts of these sciences are known and understood by those who crop the soil; and by what means are those truths to be disseminated if not by the Press? Undoubtedly one of the causes which have operated to the hindrance of agricultural improvement has been the broken channel of inter-

course between mind and mind. The incongruous facts and fragmentary evidence collected by dispersed and scattered individuals have been preserved in publications whose scanty circulation could not exhibit them sufficiently before the public eye. Local suitability has been the principal attribute of innumerable famous practices connected with the bygone art and business of farming ; and the consequence has been that, while private dogmas have been many, definite generalised results have been rare : the basis of "fundamental laws" on which Agriculture is founded is still insecure. If, however, the observations and speculations of all could be instantly placed before the attention and criticism of all, by means of cheap publications universally circulated, Agriculture would no longer hesitate so timorously in adopting new truths, and would be less dilatory in the application of proved principles.

Of late years Agriculture has certainly increased her staff of useful writers : the Royal Agricultural Society of England had, a few years ago, but a restricted competition for essay prizes, and was obliged to content its Journal Committee with comparatively meagre papers and reports ; but now the farmers are beating professional men in these increasing and more weighty contests. And political changes have aroused a universal interest in our business ; so that now instead of a fundamental practice like under-drainage remaining for years unknown, improvements of a much more slender nature struggle in vain to hide themselves from public

scrutiny; the inventions of a modest man are sure to be ferretted out by an editor or his man, and should any experimenter proclaim his successes, the nation echoes with debate about "Mr. So-and-so and his potatoes, Mr. Blank and his pigs!" "Times Commissioners" are darting about the country; amateur Arthur Youngs are feeding the columns of our journals with "farming notes" made on their railway routes; and it is not at all surprising just now to see one's self and one's farming in roman type in the papers. This is doing good: the chief regret is that the great mass of the farmers, the 100-acres and the cottage-plot farmers, do not regularly obtain this information. You who are sometimes prone to say that we agricultural writers know less of farming business—less of the handling of a bullock or the holding of a plough—than you who make no effort of this kind toward the diffusion of knowledge,—if you know more than we, and find us making erroneous statements,—*write yourselves*, it is your duty to your brother farmers to correct us. Let all men who farm well begin to read well and write well, and we shall soon have abundant and cheap information, and ill-managed districts will imitate those having present superiority.

## OUTLINE THE TWELFTH.

## DIGRESSION CONCERNING SHEEP AND CATTLE.

Before passing on to a description of Fen farming fifty years ago, we intend to notice the principal breeds of Sheep and Horned-cattle which have grazed upon the rank grass and rich pasture, coarse hay and fine fodder, fat clovers and juicy cole of our Great Level. Though our readers may be somewhat daunted, perhaps, when we place before them our remarks on this subject: in which we seem to have followed the tedious and pedantic example of the author who began a history of New York at the Deluge, and a Life of Napoleon at the Confusion of Tongues. Historians of the Ovine race have concluded that mutton was not an antediluvian dish; but that ewe's milk was a valuable article of nourishment, and sheep-skins were used at a very early period as clothing. Jebal, "the father of all such as dwell in tents with cattle," is conjectured to have been the first nomadic shepherd, about five hundred years before the flood; and after the new world had been left dry from that catastrophe, the sheep afforded milk, and woven clothing, and tent-covering to the patriarchs and ancient shepherds who pursued a wandering life in order to find pasture for their innumerable flocks; just as Arab and Tartarian shepherds do at the present day. It was

long before people could be brought to feed on the animals they had domesticated; and many of the wandering tribes preferred the flesh of the horse and camel to that of the sheep. In an account of the Calmucs and Cossacs, in 1750, it is said of them,—“The usual food of the Tartars is horse-flesh. Bread and mutton are reserved for the rich and wealthy burghers that live in their towns without ever taking the field. Their clothing is sheep-skins. In winter they wear the wool next to them; but in summer, or when it rains, they have the wool on the outside.” The following, from an old English poet, sets forth the uses of “the poore sheepe:”—

“ Poore beast that for defence of man at first created wast,  
And in thy swelling udder bearest the iuyce of dainty tast;  
That with thy fleece keeps off the cold that would our limbs  
assaille,  
And rather with thy life than with thy death doest us availe.”

Rachel is the first shepherdess of whom mention is made in ancient history; and her name, which signified a sheep, was characteristic of her occupation. Jacob, after serving this damsel's father 14 years for her sake, became the first great improver of the sheep. The flocks were originally of a brown or dingy black colour; and the speckled or ring-streaked sheep which were to be Jacob's portion, were the sportings rather than the regular productions of nature. The ingenuity of Jacob in placing the “pilled rods” before the flocks, and setting the “ring-streaked” lambs in the sight of the ewes, was undoubtedly blessed in an especial manner by

the Divine Providence; but in later times white cloths hung up in the fold and other means have been employed with some success in producing white lambs. At any rate, Jacob obtained a numerous flock of a new colour; and by breeding in all probability from those selected for their preponderance of white wool, his descendants at last obtained a fleece purely white. Rural scenery thus became more cheerful; the white wool promoted cleanliness when used as an article of dress or furniture, and might be imbued with a greater variety and vividness of artificial tints than that of a dark hue; and it has, therefore, been more sedulously cultivated in every age.

Scarcely any animal appears in so many forms as the sheep; and these are of varied habits, placed in widely different circumstances, and fulfilling diversified purposes. In Persia and other parts of the east it is found with a tail of 20 pounds weight; at the Cape of Good Hope the tail is worth as much as all the rest of the carcass; there and in other parts of Africa the sheep have clusters of horns, to the number of five or six; in Madagascar the same horns and tails are to be seen, and ears hanging down like those of a hound; about Auren-gabad, between Agra and Bengal, they are found without any horns at all, but so strong that, being bridled and saddled, they will carry children of 10 or 12 years of age; the so-called sheep of Chili somewhat resemble camels, being hair-mouthed and hunch backed, and they are used for carriage and

field labour; those of China are small, with short tails, which, however, are a lump of fat; Tercen, in his voyage to Surat, mentions sheep with bent snouts and pendent ears, with wool more coarse and stiff than goat's hair; in Africa, to the north of the Cape of Good Hope, they never eat grass, only succulent plants and shrubs; in Thibet the sheep have large broad tails; in Natolia these tails are laid in carts on wheels; in Anspach, in Germany, a small sort exist that are shorn twice a year, and also lamb every spring and autumn; in Juliers and Cleves, also, they are said to lamb twice a year, and bring two or three each time—five sheep have brought 25 lambs in a year; on the slave coast of Africa, the sheep have no wool, "but," says the old Dutch traveller, Boasman, "the want is supplied with hair, so that here the world seems inverted, for the sheep are hairy and the men are woolly"—this hair forms a sort of mane, like that of the lion, on the neck, and the same on the rump, with a bunch at the end of the tail; the Javanese sheep have tails weighing occasionally 40 or 50 pounds, having a coat of red and white hair; four-horned sheep are numerous in several parts of Tartary, and a few have six horns, with wattles under the throat.

The surface of our own country is totally different from that of the regions where sheep are found in their wild or natural state, and consequently they have been materially changed in order to be adapted to artificial enclosures, cultivation, and food. And we employ our flocks for an entirely distinct purpose

from that of the earlier and ruder shepherds : the sheep was formerly grazed for his fleece, and the ewe for her milk ; but to the important object of his wool for manufacturing, we have now added that of his flesh for eating. Mutton, though comparatively disliked at the present day in Spain and some of the most civilized countries, is universally adopted and relished in Great Britain as our commonest meat, most easy of digestion, and most conducive to health. But if we examine the sheep in his present nearly perfect state, and as the gradual improvement of agriculture and sheep husbandry in this kingdom has made him, we shall observe a numerous variety of breeds in different localities, which it would seem at first sight impossible to reduce into any regular classes. The same analytical and methodical ingenuity, however, which has classified vegetable productions by the number of styles and stamens in their blossoms, has divided our sheep into different species according to the length of their wool and the presence or absence of horns,—a still further and minuter classification, with the name of each breed, being furnished by the place or district in which such species are supposed to abound, or to be in greatest perfection, or to have originated. The various kinds have merged into some few only which are truly valuable; and which possess very distinctive generic characters; so that there is, for instance, scarcely more difference between the hill and the vale country, than the practised eye perceives between the mountain and lowland sheep.

There is a peculiar character and importance attaching to the particular points of each of these principal varieties; and we may easily arrange them into three great classes, viz.: the large lowland sheep, distinguished for quantity of mutton and weight of wool, destined to live on rich pasture, and of precisely the form for a sheep provided with plenty of good food, and without any great distance to travel or exertion to make in gathering it; next, the hill sheep, adapted to more elevated situations and shorter feed on the natural and permanent pastures, able also to travel without detriment a considerable distance to the fold and to the down, and valued for the fineness of its fleece and the fine grain and good flavour of its flesh; and lastly, the kind which is the inhabitant of a still more elevated region and a colder clime, occasionally exposed to the severest storms, yet enduring and thriving through all. The sheep of the Fens are of course comprised in the first class.

In the breeding of sheep perhaps a greater degree of perfection has been attained than in the breeding of any other live stock; and in this branch, in particular, the breeders of England stand higher than those of any other country. Not only is the English race-horse (improved from the Arab and Barb,) eagerly purchased and exported to every civilized country, but the Durham Bull, (supposed to be descended from an ancestor from Holland,) the New Leicester Sheep, and the Berkshire Hog, are the acknowledged sources from which other

nations seek to improve the animal forms of their several live stock, and perpetuate useful and symmetrical excellence. About a century since, Robert Bakewell, of Dishley in Leicestershire, by careful selection at first, and breeding afterwards from the best animals without any regard to consanguinity, at last obtained a variety of sheep now called pure Leicesters; which have been celebrated and unequalled for their early maturity, quick propensity to fatten, and fineness of offal. By the practice of letting out Rams on hire, which originated in Lincolnshire, the new Leicesters were crossed with nearly all the old races; and all their valuable properties united with the different excellencies of the latter, have descended to their posterity, and permanently and extraordinarily improved the flocks of Britain. The saving effected in the cost of production, through the early maturity of the cross between the new Leicester and the old Long-woollen sheep, has been calculated at 25 per cent.; that is to say, it would cost more than a quarter of the outlay more to supply the present quantity of mutton consumed in this country with the old animals than with the new. This has been eminently the case in the Fens; the ancient breed having been the old Lincolnshire Long-wools. They were ungainly animals, with a carcase long and thin, razor backs, legs thick and rough, bones large, pelts thick; and though attaining to a great weight they were a very long time arriving at maturity. In fact their chief merit was their wool, from 10 to 18

inches long, and weighing from 8 to 16 lbs. per fleece; and this heavy skin formerly made the breed profitable to the Fen graziers, although covering a slow-feeding, coarse-grained carcass of mutton. Upwards of fifty years ago, when Young wrote his "Survey of Lincolnshire," the New or Dishley Leicesters were spreading very rapidly over the county,—probably faster than they had done (with one or two exceptions,) in any other,—driving out the Lincolns from the poorer uplands, and improving them by crossing. "The true Lincoln," he says, "is a larger sheep, and with a longer wool, and therefore demands better pasturage; where it finds such, there the old breed remains: upon inferior land the Leicester establishes itself—from the necessity of having smaller size and shorter wool." At the present time, the pure old-fashioned Lincolns are scarcely to be found; except in some few places in the rich marshes adjoining the sea. The Improved Lincolns universally prevail, varying widely, however, in different districts. They partake largely of the peculiarities of both Cotswold and Leicester; having the expansion of frame and nobility of appearance of the one, combined in a great degree with the quality of flesh, compactness of form, beauty of countenance, lightness of offal, and inclination to fatten, of the other. But they far exceed either in the weight of their wool. They are usually kept until 27 to 39 months old, when their weight is from 28 to 42 lbs. per quarter; having also produced two clips of wool weighing

together about 20 or 25 lbs. It may not be out of place to state some instances of extraordinary weight :—a wether sheep killed in Holbeach Marsh, in South Holland, in 1844, weighed  $72\frac{1}{2}$  lbs. per quarter; 10 wethers were produced by one farmer in the same locality and at the same time, averaging upwards of 52 lbs. per quarter each; and an *Ewe* from Long Sutton Marsh, exhibited at the Smithfield Club Cattle-Show in 1846, weighed when dead  $65\frac{1}{2}$  lbs. per quarter, or 262 lbs. the whole carcass. Under good management the wool is of a quality which rarely fails of obtaining a price equal to that of the lighter Long-wools or even pure Leicesters; and there is, therefore, no breed, perhaps, that can equal this in rapidity of growth and propensity to fatten, under a fleece so weighty and so valuable. These sheep are chiefly bred by flock-masters on the neighbouring hills, and purchased by the lowland graziers and farmers for stocking their pastures, seeds, and cole. Great numbers of Half-bred Down-and-Leicesters, especially in the southern portions of the Bedford Level, are also bought for the same purpose; and in many localities the breed approaches more closely to the Pure Leicester.

Regarding the Horned Cattle of the Fens, it may be stated that—though Galloway Scots, Herefords, Devons, and Irish cattle are sometimes grazed, the Norfolk and Suffolk polled cows kept, and many of the Old Lincolns bred,—the Short-Horns are most prevalent. The usual appellation of “Lincolnshire Short-Horns” is truly applicable to the majority of

animals, inasmuch as they partake largely of the Old Lincoln breed,—possessing much of the quality of the Durham Short-Horns, and retaining the size and majestic proportions without the clumsiness of the Old Lincolnshire Ox. It is owing to this combination that the proportion of lean flesh compared with fat, is greater in this breed than probably in any other; whilst the weight to which individual oxen have attained has never been exceeded. The Fen beasts are principally bought from the highland breeders,—and most extensively from North Lincolnshire. This county has certainly “achieved greatness” for having triumphantly accomplished the grand difficulty in breeding both its cattle and sheep; it has united size with constitution and quality in such a degree as to retain the merits of each. By care and judgment in the selection of animals and the rearing of young stock, the farmers have generally transformed their large coarse Short-Horns and lean large-boned, though extraordinary milkers, into handsome quickly-feeding herds. The old breed has been crossed for many years with good Short-Horn bulls, and the produce comprises many excellent beasts which, without being too pampered and tender, are capable of being converted into beef in a more reasonable time than those which have been bred from the Deep milkers and others not possessing very fattening properties. Perfection, however, is yet far removed from our general stock of cattle, as may be witnessed at any of the large fairs; and while most wonderful

improvement has taken place within 50 years, it cannot yet be said of the Fen bullock that he is exactly—

*"A grazier's without, and a butcher's within."*

Impatient reader! we have concluded our tiresome episode on ovine and bovine quadrupeds: but as the rich grazing lands and prolific coleseed-fields are as much "the glory of the Fens" as the immeasurable grain crops, we may claim excuse for dilating so long upon the animals which make that green food available for the public in the shape of meat, and are the fen farmers' indispensable agents in the enrichment of his continually-yielding soil.

## OUTLINE THE THIRTEENTH.

### THE FARMING FIFTY YEARS AGO.

At the beginning of this century, the agricultural resources of the Bedford Level, or the southern portion of the Fens, were estimated pretty much as follows :—

The low land, after making deductions for uncultivated lands, meres, &c., was computed at 280,000 acres. The husbandry was so simple and uniform, that the means of calculating the produce were easily attained. Without attending to inconsiderable exceptions, the following courses are said to have pervaded the whole district :—

1 Cole ; 2 Oats ; 3 Oats ; 4 Wheat ; 5 6 7 8 9  
10 Grass.

1 Cole ; 2 Oats ; 3 Oats ; 4 Wheat ; 5 6 7 8 9  
Grass.

1 Cole ; 2 Oats ; 3 Wheat ; 4 5 6 7 Grass.

If the 280,000 acres are divided into four parts, and one of these rotations assigned to each, the quantity of every respective crop will be found to consist of—

	Acres.
Oats .....	52,739
Wheat .....	33,036
Cole .....	38,086
Grass .....	161,189
<hr/>	
	<b>280,000</b>

As the inundations became more frequent, the wheat crop did not bear anything like the above proportion: the calculation proceeds on the supposition that the drainage is secure.

A fair yield for Wheat was 4 quarters per acre; but we may take it at 3½, and Oats at 7. Of Cole 9000 acres, stood for seed, the rest was fed, and worth 35s. per acre. One-third of the grass may be put at 40s.; one-third at 25s.; and one-third at 16s. In these proportions, and at the then prices, the produce will be—

	Acres.	Qrs.	Acres.	£s. 1
Oats	52,739	7	369,173	at 20s., 1869,173.
Wheat	38,036	3½	115,626	, 50s., 289,065.
Coleseed,	9,000	3	27,000	, 70s., 94,500.
Cole.fed.,	24,036			35s., 149,063.
Grass	53,729			40s., 197,458.
Ditto	53,729			25s., 137,161.
Ditto	53,729			16s., 149,982.
				£1,019,402.

The country, therefore, produced more than a million sterling when free from water, implying a considerable population, and the prosperity of many classes; and from this estimate we perceive that the loss from inundations, the year anterior to Remond's Report (already mentioned,) was equivalent to the complete destruction of all the cropping of one harvest, and the entire grass and green keeping for a whole year!

It was also reckoned that the grass and coleseed,

with the straw of the crops, supported 200,000 sheep that "tad fours," or 50,000 tons of wool; 70,000 beasts of all sorts; and 20,000 brood mares.

The Colesseed fed, was valued at 8s. per acre, but rose to 50s. or 60s. The Grass, in rotation on the arable land, yielded 1½ waggon loads of hay per acre; and when fed, carried 2 sheep an acre, besides cattle and horses consuming as much herbage as the sheep. The rent all around Chatteris, and thence to Wisbech, was estimated in 1800, at 16s. an acre; the land selling at 20 years purchase. The produce of the Fens, when dry, was considered as far exceeding that of any other lands. In some localities, particularly in Upwell and Elm; flax and hemp, and upon the clay fens and marshes not included in the Bedford Level, mustard, were grown; being crops of great value. Potatoes, also, were sometimes cultivated in the field: but these crops were too partial to be considered as forming an item in the general rotations. Brown mustard was occasionally a fortune-making crop: there is an instance of a Lincolnshire farmer taking an exceedingly large waggon load to Wisbech market, and receiving £500, for it—the price being 50s. per bushel!

Previous to the general drainage, the Lordship of Thorney, with the exception of a few hundred acres of rising ground, was "esteemed of little or no value;" at the period to which the present section refers, the Duke of Bedford's average rent here was 16s. per acre. The estate would have let higher but for the hazard at which it was held; the rent

being below its fertility : if the banks gave way, the Duke and his tenants would suffer (it was calculated,) to the amount of at least £200,000. This sum on one property alone, may give some idea of what general overflows used to effect, and of the terrors which menaced the farmers during every heavy downfall. A safe and speedy drainage has now raised the rent to about double the amount last stated : and this within 50 years.

The operation of "Paring and Burning" appears to have originated in the Fens about the middle of the 17th century ; and though this seemed the only means by which the light spongy soil could be successfully brought into tillage, it was long before it became general, being principally employed by the Adventurers upon their allotments. Arthur Young says, "I took great pains in trying to discover the origin of paring and burning in the fens of Cambridgeshire. . . . The paring plough at Thorney and Whittlesea, Mr. Ground of the latter place, (whose ancestors have been settled there, and chiefly in the farming line, for three hundred years,) informed me it is called the French plough, which unites with the curious circumstance of a colony of French protestants settled at Thorney, where from 1653 to 1721 there was a French register of baptisms and burials kept, which I examined. These French families were driven by persecution into Holland, and thence came to Thorney, brought, in all probability, by the report of the Dutch engineers, who about that period were employed in the drainage of

the fens. This, I have little doubt, was the origin of burning in this part of the kingdom, as we know by the work of De Serres, that it was common in France fifty years before that period." The first mention of this process in our fen documents is probably that already quoted (Outline 9.); the author, in 1653, says, there were but 28,000 acres of the fen grounds drained and made use of, being sown with coleseed, wheat, barley, oats, and flax,—the first year's husbandry, consisting of hassocking, burning the hassocks, ploughing, burning the sward, and sowing the coleseed; exactly the same practice that was pursued 150 years afterwards. In a description of Fen management, written in 1791, is the following notice of breaking up the ancient fen,—"the surface of the fen is rough and unequal, from the great tufts of rushes, &c., (called *hassocks*.) Some persons cut them with spades, at the expense of 5s. to 10s. an acre; others with the plough: paths for the horses were, in that case to be cut by hand, and the plough (made on purpose, and called a *hassock plough*,) cut laterally much beyond the line of its draught. But opinions were in general that hand work was the cheaper; in either case the hassocks are dried, heaped, burnt, and spread. After this, in order to finish and smooth the better, they go over it with a fen paring plough, and burn again. Coleseed always the first crop, on one common shallow ploughing; never harrow it, in order not to disturb the whole furrow; but roll, or lightly brush harrow. This coleseed is either for

a crop of seed, or feeding sheep; mostly the former, unless the proprietor has a flock-farm besides. In this application, it is worth, that is sells for, a guinea an acre, but the seed from two to three guineas: sometimes much more; the quantity seldom exceeds  $2\frac{1}{2}$  qrs., but 4,  $4\frac{1}{2}$ , or even 5 qrs., have been obtained." The paring was usually done with the fen plough in the spring, as thinly as possible,—the depth being from one inch to an inch and a half. The burning was very carefully performed; a *black ash*, with much half-burned turfs, being preferred to converting the soil into red ashes; and for this purpose the heaps did not cover more than a circle three feet in diameter, or at most four. The Dutch, or French, or Fen paring plough was originally constructed with only one handle, from the hinder part of which projected a kind of crutch, horizontally disposed, and upon this the holder bore with his left hand, walking upright. From the same handle another crutch projected at right angles with the former, but much lower down, and this the holder used occasionally with his right hand, for the purpose either of keeping the plough steady, or to turn it at the land's end; more recently, however, it has been made with "hales" or stilts, in the common form. The ploughman carried a file with him to keep the edge of the share and of the "skeith" (or wheel coulter,) very sharp, for it was so near the surface, that it met with many strong roots and much coarse grass, which require keen instruments to cut them. The skeith was well adapted for ploughing among

the rough sedge; and a clog was sometimes added to lap in the rushes, which it did effectually. The share was broad and heart-shaped, at the bottom of an upright bar or coulter, which was pinned into a mortice in the beam. Extending horizontally from the back of the share were two bars, upon which the plough滑id; they were fastened by pivots to each wing of the share, and bending to an upright position at the hinder end of the implement, could be set closer or wider by means of a groove iron fixed at right angles on the beam. Other varieties of this plough, known as the "three-quarter," and the "half Dutch," differing in the breadth and strength of the share, were likewise used, the latter for that ploughing in which coleseed is brushed in, and upon which white crops are harrowed.

As a specimen of Fen husbandry under the Paring and Burning system, we cannot do better than give an exceedingly interesting account gathered in 1791 of "Burnt Fen" in the South Level, lying in the county of Suffolk. And here we may observe, that to pourtray the farm-management of a great tract like the Fens would require a large space, and after dividing it into districts and describing the farm-management of each, these districts might be subdivided into large "fens" and parishes of 10 or 20 thousand acres each, of which not even the names had been referred to. A person may sometimes think that he knows pretty clearly the farming of the Middle or South Levels, and may depict it in the newspapers; and yet when he comes to pierce

into the remote corners of those great divisions and to pass through the heart of their outstretched lands, he discovers wide parishes and spacious fens, of which he had scarcely heard before, each comprising many large estates, and scores of farms,—the inhabitants viewing their neighbourhood of prime importance, and possessing as long a traditional history of the drainage-works, land floods, and improvements pertaining solely to that locality, as he might have supposed would embrace the history of all the Level. In short, writing a full account of the Middle and South Levels simply under these terms, is very much like giving a particular history of North and South Wales without mentioning the counties,—each of which might consider its respective population, county town, natural features, antiquities, modern wonders, &c., entitled to a special section of the work. We cannot swell our present series to a length sufficient to embrace the separate districts of importance; we single out Burnt Fen of 14,000 acres,—but there are many others of equal or much larger extent, which we shall not even name. This was formerly of so little value that about the year 1750, 500 acres were hired for a guinea a year; its cultivation began in 1772, when an act was obtained for its separate drainage: commissioners were appointed who were empowered to levy 1s. 6d. per acre, which was mortgaged for the expense of the drainage, the Banks, mills, &c. This being found insufficient, in a few years another act was procured for 1s. an acre additional levy. But

which was only temporary. The second act had scarcely passed before the banks blew up, owing to an embankment (under an old act.) being undertaken by the parish of Feltwell, in the vicinity : this threw such a weight of water on the banks of Burnt Fen, that they also gave way. Embanking was not then, even as lately as 1772, well understood ; the failure was owing to their having made a ditch for the purpose of raising earth for the bank too near it. It was in 1777 that this accident happened, and, by ill luck, in harvest, so that some corn was got in, miserably it may be imagined, in boats. The undertakers lost all their capital; and soon were ruined. From that time till 1782, the Fen produced little; men were too full of apprehension either to buy or hire; though most of the lots were annually put up to sale, and to be bought merely on an engagement to pay the tax of 1s. 6d. per acre.

About 1782, the courage of the neighbourhood revived, from seeing the effect of the *bear* (a machine consisting of a cylindrical frame studded with projecting blades,) in cleansing rivers and canals; and especially of new operations which opened an easier way, for the great masses of all the fen waters, to the sea, by Wisbech, instead of Lynn. The lots of Burnt Fen began to be purchased, and no longer given away; the banks were repaired most substantially, and on a better plan; some mills were erected at an expense of £600. each; there were six or seven in all, but three only were worked, except occasionally, being found sufficient. Principal drains

were cut, or cleansed; and ditches made between lot and lot. In the effect of these measures a remarkable circumstance happened; Burnt Ean was no sooner tilled, which it was very speedily, but the Fell-well embankment, badly executed, and no spirit exerted in its preservation, blew up in its turn, and for a great many years there were under water to the amount of six or seven thousand acres; but had the proprietors of it exerted themselves at the first time, and in the same manner, as those of Burnt Ean, that great tract would also have been quickly stoned and under cultivation. And if one member of a community cannot obtain a comfortable subsistence without ruining another, it betokens some egregious mis-arrangement and inequitableesses in the legal administration of that community; and if an individual ten canot dry itself without drowning its neighbours, it manifests a capital defect in the general system of outlets ostensibly provided for the drainage-water of all. A communist might employ the above case to illustrate some of his views; he might say, it is a pattern of our present society, instead of individuals rendering in proportion to their capacity and labour, they get nothing unless they can maintain equality with their enterprising and adventurous neighbours, by a strenuous and ever struggling competition. For our own part, we may say that it shews how a great impediment in the general works appressed the separate districts, forcing them to otherwise un-

necessary to hand outlays; it was an urgent case for the advocates of the Eau Brink Cut.

The success of the new measure was rapid and extraordinary, at that time perhaps unparalleled. The rise of value in the lands of this fen from that period was such as will not be easily credited by those acquainted with the Fens. Lots were bought for £200.; with almost newly erected buildings on them, that cost three, four, and £500.; such lots let in 1701 for £1000 per annum. An estate formerly bought for £200., would then sell at £2000. 800 acres were bought for £25., or £30.; half of it was afterwards sold for £100., and the other half for £800., which was resold for £800. Three farms that had been recently bought for £600., would then let at £900. a year. And 300 acres bought in 1700 for £150. would let (eleven years after) at £0s. an acre. These instances show the immense profit arising from the increasing value of the estates, consequent upon a secure drainage. We come next to the cultivation, the detail of which will increase the reader's surprise, for he will find that those who bought estates here, received them at poor expense, but, on the contrary, were well paid for accepting them. And now a brief account of this. The first work was erecting very small houses, usually for the residence of a managing bailiff; generally with a little barn and a few conveniences for cattle, &c. On a farm of 180 acres, for instance, all the buildings cost only from £120. to £150. But some good houses were built for proprietors who

chose to live here. Grass-drains were cut at the expense of the proprietor, and at his pleasure; the soil being chiefly a black peat, its expense was very low, and if burnt for fuel or ashes, nothing at all. Then came the preparation, and crops described in the former part of this chapter, and the great success so quickly and so easily attained, is not at all surprising when the nature of the soil is considered; it was not barren earth that made this. Far a waste, but the excess of water upon and within it. The soil to 4, 5, 6, or more feet in depth was a black moory peat or bog, or sort of "natural compost," and when freed from immersion in poisonous vitric water, of exceeding native fertility. Oats followed the Colesseed, on one ploughing, if the crop was fed, but more if needed, the produce from 5 to 10 quarters an acre; in the commencement they sold (from their lightness,) at no more than 8s to 10s. a quarter, but for some years prior to 1791 (when this information was collected,) up to 1789, at 10s. The average for the three years 1789, 91, was 14s., weighing 11 stones per coomb. At this weight and price, however, one-sixth of the crop was tail corn, not saleable, but used at home, being worth scarcely half price. It was common to take a second crop of Oats, which were not so good as the first by one-third. With this second crop, they laid down to grass, sowing, per acre, two bushels of ryegrass, and 6 lbs. of red clover; if no ryegrass, two sacks of hay-seed and the clover. This was left six or seven years, till it ran to the spontaneous fow-grass,

"maiden-hair" (*briza media*); red-robin (*agrostis stolonifera*); &c. It was then ploughed and burnt, and reseeded again sown. In this stage of the improvement, wheat was sowed on the stubble, bringing 2*1/2* qrs. an acre; but at this crop of oats, the improvement was considered as complete, and the farm ready for a tenant.

Such was the general fen management at that period. To show the most "scientific" husbandry at which a few of the very best model farmers had then attained, we add the following observations of the author from whom we have derived the above interesting details. And we may learn from this account, the great value of even a single new process or discovery to agriculture, for the practice then needed (as an improvement is now reprobated by the farmers of this very fen as worn out and unprofitable; and mainly because the solidifying and strengthening root, which then lay in an undisturbed bed beneath the light loose earth, has since made known its worth and arisen to replenish and enrich the fens. In this district, where once it supported a teeming vegetation and a massive forest of tall and wide-branched timber, after lying buried for centuries mort and dead, a resurrection has again developed its active and vivifying powers and influences; and it has been and is still being applied to the surface as an invaluable geological manure. As to the process, the remarks are these.—As I have paid a good deal of attention to the cultivation of this species of soil, in both England and Ireland,

I will venture a few observations, not drawn altogether from theory, but from much practice, though of others, and not of my own. & will tell how the bad husbandry of taking the second crop of Oats, which is inexpusable, can be done but with one view, that of lengthening the tillage, in order to destroy the spontaneous growths; that this may be much better and more effectually done in another system, which will not exhaust the soil. This seeding-cole must not be prohibited on account of the money return it yields to render him the improver, but feeding is far preferable, and it should have time for all the tillage and burnings to be desired. After it, a second rough paring and burning (of sod and cole stalks) should be given, and a second crop of coleseed sown. This, inevitably, to be fed with sheep, and the land in the spring to be ploughed three times, if possible, but if not twice for oats; in these ploughings, all care that betrays the fen growth, to be collected and burnt. If any suspicion, then, of the spontaneous growths, not being effectually destroyed, a third crop of coleseed, will absolutely secure it. In either case Oats follow. With them a full seeding of artificial grasses and good natural ones to be sown, but as little hay grass as may be, and on no account any hay seeds: common clover, trefoil, white clover, ryegrass, and burnet, are all to be bought in any quantities, and good separated grass seeds, should they at the time be purchaseable reasonably; I conceive that chiefly, from the spots in which I have seen great crops of

it would thrive well; but this is conjecture. Thus laid, being tender of mowing for hay as convenience will allow; a good stock of it must be had, but know no more of it than from necessity. Manuring on this soil, with burning, will give vast cabbages, which would lessen prodigiously the necessity of hay. The breed of cattle on this soil is of great consequence; and with their urine and dung, added to the quality of seeds, that every year, when fed, man and vegetals, would improve the pasture and very much lengthen its duration. And let it never be forgotten, that grass, not straw, is the great object on these soils. However, it may wear out once (the first round,) though it never will again with proper management; and in this case no better practice than to pare and burn for two crops of barley; then oats, and lay down again as before; but never to take a second crop of oats. It may then be rich meadow for ever, worth much nearer £200. per acre than the present conclusion of letting ground at £200. The plough never to enter without burning all spontaneous tufts carefully.  
*This extract has not been given for the sake of abiding antiquity; of course modern farmers know very well that "grass" is not now "the great object" on the fens; but it was so in former times; and the above opinion is that of the man who knew the best method of management for all soils which had come into use in his day, — his name is ~~Walter Hunt~~ — I find near the end of his life he turned to ~~the~~ a description given of the Huntingdonshire*

fens about sixty years ago is, that they yielded but little profit on account of the great defect in the general drainage. They form about one-sixth part of the "Bedford" Level, lying furthest from the outfall; and owing to their remote and low situation, scarcely one-quarter of their surface could at that period be called productive, — even this being hazardously kept from inundation at an expense equal to nearly one-third of the rent. The precarious state of these fens occasioned, from the time they were drained, the introduction of a mode of management that was barbarous in the extreme; for nothing was thought of but getting as much as possible out of the land, and trusting to the general drowning for restoring its goodness. But at the period to which we have referred the common husbandry was, first, to set apart some given proportion of the farm, which was held sacred from the plough; then, to have one-third part of the remainder under the plough, and two-thirds in grass; keeping the whole of that remainder in a succession of silage and grass. That portion which was immediately under the plough was divided either into three or four seasons for occupation, as follows: — If into three, — first year, pare and burn after six, seven, or eight years' grass; and released brushed in upon the first ploughing, but little or none suffered to stand for a crop, it being fed off in the winter with sheep. Then generally after one ploughing, sowed the second year with oats, which were generally so rank as to make it impossible to have grass seeds with

them. Third year, wheat or oats, with seeds,—to remain until it come again into a succession for tillage. If three crops of corn were taken, oats were sowed after the wheat, or wheat after the oats, and sometimes oats or barley, and the land was then laid down, &c. above. The grass-seeds formerly used were (this) common red clover, with hay-seeds, or common rye-grass; but white clover (called at that time Dutch clover,) had been introduced and was much approved of, not only for its natural durability, but because it was found to bear drowning, which was not the case with common red clover. Sheep were bred in the cultivated parts of the Huntingdonshire fens, and were mostly of the Lincolnshire sort, and not the best of their kind. A few cows were kept for the dairy, the produce of which was generally mared, but these were also of a very ordinary description, being a sort of mixture between the worst of the short-horned and long-horned breeds. Mares were used for all the purposes of agriculture, and every farter bred from them as many foals as he could,—selling the colts off at two years old, and as many of the fillies as could be spared, with proper attention to the filling up of his team, as the old ones were off. Oxen were wholly inapplicable, for they could not walk upon the surface of the fen land without being bogged. A writer who described the agriculture of the county of Huntingdon in 1793, says, “The fenmen are the most expert of any in the world at ploughing, no such thing as a driver being known, although

they frequently plough with three mares, which are always abreast and guided by a line; and it is inconceivable how fast the business proceeds; a bold fen ploughman has been known to win two shillings a wagon, by ploughing land at the rate of high land without a single haul, keeping his horses always galloping at trot, even at the land's end; those being the conditions of the bet, as proof not only of his own expertness, but that this plough was constructed upon the true principles of mechanics. The common rate of ploughing is about two statute acres with the pair of ploughs, and about one acre and a half with the steady plough per day." The cultivated part of the fens of Huntingdonshire being comparatively small, had very little effect on the price of labour in other parts of the county, notwithstanding that there were very few habitations for labourers within its limits. When the harvest generally came in after the harvest of the high land, it was sown over most of the great part of what was really cultivated, was held by farmers not resident in the fens, as appendages to their high-country farms in the same parishes, and of course, so far as they were concerned, the husbandry was carried on by their constant labourers and such hired servants. On farms thus occupied, expense entailed perpetual robbery in order to fertilize the high land farms, speaking of paring and burning, Arthur Young says, " In the case of the many fen farms that had high land adjoining, the practice must be good, or the soil parts would have been ruined long ago, for everything was taken from

them; and nothing ever carried to them: the great crops they yielded were the means of amanuring the higher lands, the farmers trusting the lower parts to the efficacy of burning off the old and manuring the new. The farmers who held land as a helpmeet to their high land farms, employed the same waggons, carts, and other implements, excepting ploughs, on both the high and low farms; but those who resided in the fens did not use carts, but light waggons drawn by two marts abreast, with a pole. One side of the waggon was made of loose boards, which could be removed when the vehicle was wanted for the carriage of dung; and this the driver commonly spread upon the land from the waggon, it having been first either thrown into large heaps in the yard or carried into still larger heaps at some intermediate spot. The average rent of the Huntingdonshire fens at the time of which we write, was estimated at about 10*s.* per acre, subject to tithes, reckoning only upon the cultivated part, and excluding therefore about three-fourths of the whole quantity, which probably produced about 1*s.* or eightpence per acre on the average, though very many acres yielded no rent at all. The powness of the rent was the consequence of an uncertain state of drainage; which was also gathered, defective that the seed-time depended entirely upon the weather, the land having been sometimes sown as late as the middle of June. The above information will enable the agricultural reader to picture to himself the general mode of

farming over most part of the Bedford Level. But we will add a few further particulars, more especially relating to local improvements before the commencement of the present century.

The common land in the parish of March was inclosed in 1793. It consisted of 3440 acres, about 1500 of which was high land not subject to floods. The whole common was never ploughed, and was much overrun with rushes, thistles, &c. There were 180 commonable rights, the average being about £7. a-year to let; each for 6 cows and 1 horse on the high land commons, 4 horses or 8 "neat beasts," or 32 sheep, on the fen commons, from May-day to Michaelmas: from Michaelmas to Lady-day they stocked 4 horses or 8 beasts, or 32 sheep to run over the whole of both commons; except from Lady-day to May-day, when the highland commons were laid for pasture. After the inclosure the land let on an average at £20. a right, and per acre over the whole, 25s. It was converted for the greatest part into tillage; the course being,—1. Pare and burn all the fen land for cole, fed with sheep: some for seed. 2. Oats. 3. Oats or Barley. 4. Wheat. 5, 6, 7, 8, 9, 10. Seeds,—rye-grass, hay-seed, white and red clover, and rib-grass. The same courses were admitted on the high lands. Young, who collected these facts, says in his notes,—"To sow Cole they choose the first week in July, if for seed, the end of that month and beginning of August; and it has been done on an oat stubble after harvest. Oats they sow about

May-day, and some all through May; plough for them but once; quantity of seed 6 bushels. From Michaelmas to the middle of November they sow wheat; brine and lime the seed,—plough once or twice; drilling very little known; but dibbling is coming in both for wheat and oats; the expense 10s. 6d. an acre, and answers very well. The quantity of beans but small. "Sown in February, 5 bushels an acre on one earth, never hoe, but sheep feed the weeds. Produce,—Cale fed £1. 11s. 6d.; average of seed 8 coombs. First Oats, 10 qrs., second Oats, 10 qrs., Wheat 4 qrs." There were about 1000 sheep kept in summer before the inclosure, and in winter perhaps 2000; probably 1500 for the year. The sheep were good, and would give 4 fleeces to the tod. After inclosing, the number was not a thousand: 1090 cows were regularly kept as a stint stock,—but afterwards, not 100. The number of horses decreased in the same manner; for the dairymen and others had kept teams for their business and for hire.

The whole expense of this inclosure came to about 20s. an acre, roads included; and being brought into tillage, in seven years it produced £163,000. Wages rose from 1s. 4d. per day in summer to 2s.; and the expense of labour amounted to 25s. an acre on the whole 3440 acres; the houses were all filled, and several new ones built. The Poor, then, were benefitted as well as the Landlord, the Tithe-owner, and the Farmer? Yes, they certainly received better pay for their work; but there were many

reduced to labour by the change who had not previously been "poor." In 1667 a decree had been obtained for setting out nine acres of mowing ground to each commonable-house, so that the cows could be kept in winter as well as summer; and they paid about £5. for a cow. About 20 dairy-men who made an entire livelihood, and brought up their families decently, in consequence of this regulation, were reduced, after the enclosure, to day-labour or emigration. These men were mere hirers and had no common-rights themselves; those who had, to the amount of above 100, were all greatly benefitted.

Chatteris had 3000 acres, which were open-field arable and grass alternately: the course was—1. Pare and burn for cole, fed; some left for seed. 2. Oats. 3. Oats (some wheat). 4. Oats, but where the cole was seeded there were only two crops of Oats, the land was then laid down to grass for four years, being then limited common. To this management the farmers were tied; there being severe penalties for disobedience, and officers appointed to see the rules complied with.

The Duke of Bedford's estate of Thorney Lordship, comprising 17,500 acres, was in the arable parts, entirely dependent for its fertility upon the practice of paring and burning. The course of crops was,—1. Pare and burn for Cole; which was fed with sheep, supporting on an average six per acre. 2. Oats. 3. Wheat; sometimes Oats. 4, 5, 6, 7, 8, 9, 10. Seeds; or as long as they would

last good. This system had several recommendations. First, the land was peculiarly adapted for oats, which crop succeeded well upon the above preparation, the produce being from 6 to 10 quarters per acre. Secondly, the wheat did well after oats, the farmers had no reason on account of yield to devise a better course, for 4 quarters was a common crop. Thirdly, Seeds answered better with wheat than they did with oats. And the autumnal sowing of wheat had proved so hazardous, from wet and worm, that the tenants (at the beginning of the present century,) got into the custom of sowing it in the spring.

In the year 1797 some experiments were made by the Duke's orders, to prove whether *burning* was really necessary. It was imagined that *deep-ploughing* would do better: but the success was so very bad as to ascertain the point satisfactorily. A crop of oats was tried after coleseed on deep ploughing; and, while all the surrounding crops after burning were very great, this was a failing one, full of weeds, except on one land which had been burnt. A farmer, in 1800, tried oats without a previous burning; and the crop was destroyed by the red worm. Thus were doubts entering into men's heads as to the permanent feasibility of the operation they had trusted to so long; and another practice ventured to suggest itself, with small hope indeed at first of being able to supplant the old one, but still essaying its power so as to be in the field ready for action whenever the right con-

ditions for its career should be effected,—deep ploughing and claying were to supersede paring and burning when the ground ceased to be saturated with wet and elastic like a sponge, and became free and firm under the cleansing and ameliorating relief of a better drainage. Does paring and burning lower the surface of the soil? Drainage and tillage do this we know,—albeit some wiseacres had rather fancy that the solid clay rises than that the soft moor condenses. Observations of the fen land have shown that such is the case when burning has been followed up at too frequent intervals; but if the land be allowed to “skin” between the operations, there is no waste in skilful burning. It is certain that the wholesale style of paring which prevailed in many districts dissipated and destroyed much of the soil; and that in many instances the dry inflammable peat has caught fire and been consumed (which is called “pitting,”) so as to lower the surface six inches or more. Drainage and culture, however, have been the chief causes of the subsidence of the surface of almost all the fens; and the same causes have also occasioned the deepening of the staple, by the conversion of the brown moor into a soil of peat-earth through the action of the atmosphere and the various processes of cultivation.

In the peat fens of South Lincolnshire, fifty years ago it was customary to begin the course of tillage by paring and burning; but burning repeatedly or even a second time, was not frequent: it was general to fallow for coleseed, to be eaten off with sheep,

every third, fourth, or fifth year. Oats and coleseed were the only produce until the first luxuriance of the soil was somewhat abated; when the land began to acquire more consistence, from mixing by tillage, wheat was sown, and formed almost the principal crop. Fallowing was called "bobbing," and performed as follows: plough the land over in the winter, in the spring cross-plough; harrow and plough again in May or June; then with a long tined wooden harrow, and an instrument called a *bob*, collect the roots of weeds and vegetables together, these shake up and burn; repeat this till the land is perfectly clean; the ashes being spread at each burning, if more than one, and then sown with coleseed.

Drilling had not become an established custom,—it was practised chiefly for beans, and sometimes for turnips, and Arthur Young says, "Were all the men known who have tried this husbandry, and laid it aside, the advocates remaining would not figure by their number."

Potatoes were set and taken up just as at present;—they were largely cultivated in the neighbourhood of Spalding, and especially about Tattershall and Coningsby. They were used not only for feeding pigs and supplying the towns, but also for feeding bullocks, young cattle, horses, &c. Woad was extensively grown in Holland Fen and some other districts; and both Hemp and Flax in several localities, particularly about Swineshead. The general management in the Witham Fens appears to have been,—1. Pare and burn for Cole,—which

when let stand for seed sometimes yielded 3 qrs. an acre. 2. Oats. 3. Oats; from 8 to 9 qrs. an acre each. 4., 5, 6. Seeds. Then pare and burn again for cole, but as thinly as possible; some farmers, after the seeds, fallowed for coleseed, and wheat was taken by others with good success.

Other particulars of the individual fens in South Lincolnshire will be furnished when we relate briefly the improvements in drainage which have brought them into their present fertile and thriving state.

## OUTLINE THE FOURTEENTH.

OUTFALL IMPROVEMENTS.—ENCLOSURES FROM THE WASH.  
—DRAINING BY STEAM.

Again we escape from tedious rotations, ploughings, and seedlings, to proceed with other historic details. We cannot invariably keep to a chronological order of events, but we may vary the narrative so as not unduly to bewilder the reader. Our present change shall be from the Fen fields to the river estuaries, both of which areas were the scene of a rapid transformation from wet to dry—from the dominion of drowning floods to that of cultivation.

The Eau Brink Cut has been already noticed ; and it will be remembered that no less than 23 years elapsed between the passing of the Act and the commencement of the works. It was much the same in the case of the Welland Outfall. In 1794 an Act was obtained for improving the embouchure of this river, and better draining the low grounds and discharging their waters into the sea. A canal was to be cut from the Reservoir below Spalding, so as to join the channel of the Witham at deep water in the Wash ; thus obtaining a good outfall for Deeping Fen and adjacent districts, and leaving the ancient bed of the Welland and the wide Fosdike Wash to be embanked into good marsh land. The scarcity of money arising from the war postponed the undertaking for many years ; but early in the

present century the work was begun, and the main parts executed, a straight channel several miles in length being formed for the Welland waters, a large proportion of the green marshes and bare sands of the estuary embanked, a turnpike road carried along the outer sea bank, and a drawbridge constructed over the new channel at Fosdike. The works cannot be said to be yet completed, as the channel is still being excavated from time to time in a straight course to seaward through the shifting sands of the Wash. This improvement benefitted the navigation of the port of Spalding no less than the drainage of all the extensive tract of low land which discharged its waters by this river.

The Nene Estuary was originally the largest mouth of the Fens, and issued the principal floods of high-land and low-land drain-water; but when its main streams were diverted to Lynn, it had not power to beat back the muddy tides from its broad bed, and it continued, therefore, to silt up, until the meandering freshes parted into several channels and sluggishly loitered upon the sands. The estuary gradually changed into an expanse of out-marshes, from half a mile to three miles in breadth; and upwards of 20,000 acres of land have been finally inclosed from it,—while still leaving a sufficient outlet for the disengaging waters. The North Level and other districts dependent upon this outfall were for a long period in a drowned and desolate state. In 1723, a cut was attempted through the open marshes, in order to give the lands relief.

This promised to give an additional fall of five or six feet for the drainage water; the cut itself (two miles long,) was actually completed and a dam was being made across the old river to divert it into the new one, when the Wisbech Corporation “demolished the works!” The effect of this mob-like *levelling* was that the country continued to be afflicted with sore disasters for at least 50 years longer. In 1775, however, another Act was obtained, and the cut, one-and-a-half miles in length, was excavated at an expense of £10,000., and named after its projector, “Kinderley’s Cut.”

This was only a prefatory undertaking;—and as the evils were unremoved, Mr. Rennie published his Report on the subject in 1814;—recommending a new channel to be continued from the end of Kinderley’s Cut to the level of low water in the Wash,—simply because by this work a descent of at least ten feet might be removed, and the drainage lowered to that extent. After an unparalleled contest, an Act of Parliament was obtained in 1827, —and the new channel (six miles in length, and in its widest part 300 feet wide at top and 24 feet deep,) was completed in about three years. In 1831 and three following years, under another Act, a main drain was made for conveying the waters of the North Level into the new outfall, and the internal drains were improved; the general drainage was lowered more than was anticipated by the promoters of the undertaking, and the navigation of the river was benefitted in a surprising degree. The

cost was immense ; but the improved value of the low lands, owing to the water being lowered many feet, was exceedingly great—as much as 100 per cent. over some large districts.

By way of showing some of the difficulties attached to outfall improvements, we will quote from Messrs. Walker and Craddock a description of the completing of “Woodhouse Marsh Cut.”

For the benefit of Navigation it was determined to make a new channel to straighten a bend at the upper end of Kinderley’s Cut ; and when the new cut had been sufficiently excavated it was necessary to construct a dam across the old channel in order to divert the water into this. It was soon found that the flux and re-flux of the tide over the materials thrown in to form the dam gulled holes on each side to the depth of 20 or 30 feet. A new plan was tried, and sand-bags were employed to construct it. For several days the operations produced no dam ; “on the contrary, the workmen were of opinion that the part of the river where they were letting down the sand-bags became deeper, which puzzled them to account for, until a number of empty bags were picked up floating below Sutton Bridge, which fully explained the mystery. The sand had oozed through the pores of the bags, which, being thus deprived of their gravity, floated down with the current.” An inoreidle deal of labour, time, and money, had been expended upon these works ; when, a large quantity of stone being provided for the dam, it was resolved to finish the

undertaking. "On the morning of the 7th of May, 1832,—everything being prepared for the trial,—three gentlemen, who had taken a lead in promoting the scheme, went down to the works to witness the operations, and with the determination to get the dam closed, if possible, before they returned. In addition to the regular labourers, the assistance of several farmers with their teams was procured, and the work progressed with great spirit until tide-time, which happened about noon, when the dam was so far advanced as to allow teams to pass along the top from one side to the other in apparent safety. But, at this critical moment, the elements seemed to conspire once more to frustrate the attempt. A gale, which had blown from the north-west during the morning, increased with the rising of the tide, and added four or five feet more than had been calculated upon to its height. The dam, so hastily constructed, was but ill adapted to resist this extraordinary pressure and tumult of waters, and began to give way, and in a few seconds the whole was laid prostrate by the raging elements, while those who had beheld its progress during the morning with satisfaction, stood almost petrified on witnessing this instant demolition of their favourite work, which but a few minutes before they had looked upon as all but completed. The superintendent and workmen, giving up all for lost, adjourned to dinner, while the members of the Corporation remained gazing upon the desolation before them, exposed to the bitterness of a storm

that seemed more like November than May. However, when the tide became stiller; as it approached high water, it occurred to them that with promptitude the dam might yet be taken before the strength of the ebb. Accordingly, all hands were summoned to their posts, and after considerable reluctance, even on the part of the superintendent, operations were resumed with increased vigour, and before the ebb acquired its strength, the waters were forced into the new channel, the bed of which was six feet above that of the old one. At first the waters found their way but slowly through this new course, but in a short time they acquired the force of a mountain torrent, tearing up the soil with tremendous power, and in a few hours the cut was completed so far that the gentlemen who had come down to witness the operations, had the pleasure of seeing two vessels sail through before they left the spot, and this undertaking, which had caused so much anxiety and expense, completed, without interrupting the navigation for a single tide."

Before we proceed to enumerate some of the important changes which were wrought in the agriculture of the Level mainly through these outfall improvements, a few words may be added respecting the embankment of the marshes from the Wash. This great bay seems to have preserved its general shape for many ages notwithstanding the continual reclaimings of land upon its shores ; for if the sea were allowed to overrun the marshes for some miles inland until stopped by the original barrier called

the Roman bank, the Wash would still appear as a large trapezium with its base forking into three main estuaries. About the year 1660, another sea-bank was made round the coast of South Holland, taking in about two miles breadth of land. In 1792, an Act of Parliament was passed, for embanking and draining certain salt marshes and low lands, in Spalding, Moulton, Whaplode, Holbeach, and Gedney, containing in all about 5389 acres. This work was completed about eight years afterwards; and proved of great value to the proprietors and the public. Minor enclosures have been from time to time made; and some parts of the country seem to be intersected with a complete network of embankments,—different squares and patches having been successively shut in from the tides. Along the Lincolnshire coast between Fosdyke and Boston, and northward of the latter town, similar embankments have been made; and the same in Marshland,—so that the outer range of sea-banks in all these districts is now several miles further seaward than the first or Old Roman Bank. In South Holland are no less than 59 square miles of country, or about 38,000 acres, outside that bank, and therefore enclosed from the sea since 1660,—the newest embankment being about four miles from the first or oldest; and reckoning the new marshes north of Fosdyke and Boston, there must be in the Lincolnshire part of the Great Level alone a total quantity of 80 square miles, or 51,000 acres, that have been stolen and fenced out from the waves within the

last 190 years. The embanked lands in Marshland within the same period, may be estimated at about 25 square miles, or 16,000 acres; making a total of 67,000 acres enclosed in that time from the Wash. One of the principal works of this nature here, was that of Count Bentinck, about 60 years ago;—the embankment was four miles long, and closed in 1000 acres of rich marsh.

The modern marsh land is some of the highest in the Level, being in some cases 16 or 18 feet above the general fen land; and it rises in steps at each embankment towards the sea, the latest enclosed being usually the most elevated. The whole Wash is only a broad expanse of marsh land in the course of formation; and it is easy to imagine how this should be the case. Although the Lincolnshire coast is protected from excessive tidal abrasion by Spurn Point serving as a jetty to the tide-wave, the waste of the Yorkshire cliffs is very great; this, with other material, being principally carried into the mouth of the Wash. A very small proportion of the sediment held in suspension by the flood tide returns with the ebb; and the bay is therefore being slowly warped up by the sandy accumulations. And when the immense quantity of matter thus left is considered, it is not surprising that the Wash should be nearly filled by sand-banks, and its river channels so uncertain as to shift occasionally several miles in a few years. Indeed with the exception of one broad channel running through the centre of the Wash with an average depth of 10 fathoms, the

rest of the bed is a series of sands dry at low water and shallows of one or two fathoms. The "Norfolk Estuary" scheme, now in rapid progress, is for enclosing 50,000 acres of these sands; the "Lincolnshire Estuary" 30,000 more; and the "Victoria Level," if ever executed, will complete the enclosure of 150,000 acres by barrier banks, leaving a four miles channel down the middle of the Wash. This is only a matter of time and money; as whenever the thickened tide-water is restrained by some simple impediment—as faggots fastened down with stakes, &c.—from returning rapidly into its channels, it will deposit from six inches to two or three feet thickness of soil in the course of a summer. By this kind of process the banks of the river Welland have been made to continue themselves in a direct course into the Wash,—the out-flowing river being artificially compelled to scour for itself a straight channel through the broad flat shoals and sand-banks. Improvements of this kind are the only sources from which the Great Level can derive a natural drainage for all its parts; seeing that they alone can lower the general drainage water;—and this they do by facilitating its escape from the internal drains and rivers,—opening and cleansing the great outlets by securing a minimum of obstruction to the flow of the back-water, and freedom from angles and bends which favour the deposition of sediment.

The benefits arising from the Outfall improvements were incalculable. The natural drainage acquired by some districts, the reduced head of

water against which the mills of other fens had to throw, and the advanced value of the lands thus benefitted, are only part of these advantages. The whole Level felt relief, and fen agriculture experienced a complete revolution in its modes of management. As the drainage improved and tillage was more extended, the light black earth became stiffened and reduced; and as the surface subsided, the underlying clay was in some districts so nearly approached as to come within reach of the plough. Being thus mixed with the surface soil, its virtues were discovered; and within the last 30 years the system of digging and throwing up this clay where it is too deep for the plough has been introduced into universal operation. The new husbandry quickly extended itself: farmers may be cautious of new improvements, but this was too obvious for dispute, too near at hand for refusal. The paring-plough share became red with rust; and the clouds of white smoke, with their acrid bituminous smell, in a great measure forsook the fen air: the "gaulting tool" was kept bright and sharp; and the fields were cut from side to side with deep trenches, and the solid slate-coloured clay flung out upon the light sooty moor.

The nature of the land was changed; and a new system of cropping was required. The old pastures and fresh seeds of the moist or powdery peat were exchanged for the richly cropped arable of the new corn-bearing mould. The clay gave solidity and tenacity to the soil, and prevented the too rapid

evaporation of moisture by the sun; and supplying siliceous matter for the nutriment of the wheat-stem, while the peat gave carbou for the green leaf and stalk of the cole, unitedly formed the most fertile and productive of soils,—yielding in abundant luxuriance both wheat, oats, coleseed, and turnips.

This progress of fen farming was undoubtedly the result of a more thorough and secure drainage: and this must not be regarded as arising from the outfall works alone, but also from the introduction of Steam-drainage—which immediately followed the opening of the main rivers.

As early as the year 1800, the question of the applicability of steam-engines to the drainage of the fens, seems to have been entertained. There had been improvements in the wind-engines; a Dutchman named Eckard had invented the inclined scoop-wheel; and several of this construction had been erected in different localities,—one at Wisbech. But these never obtained popularity, and the real desideratum was a power that would be under constant command. Arthur Young appears to have enquired into this subject, and in his “Annals of Agriculture”, published a letter from an engine maker (who had contrived a new and ingenious form of steam-engine, well adapted to purposes where small power is required,) informing him that “an engine of the price of £180. (which I call a three-horse power,) would clear 1000 acres (supposing the water one foot deep) in fourteen days, going night and day,” raising the water six feet high.

The consumption of coal would not exceed four bushels in twenty-four hours. Young adds,—"Mr. Scott, of Chatteris, thinks that these are a great desideratum for the fens. They often want wind, and the drainage is, from this cause, very imperfect: he has known them stand still for two months together, when most wanted."

Smeaton was of opinion that steam would one day improve the fens; and Mr. Reanis endeavoured to introduce steam-engines here, but he could only prevail on the proprietors of one district to erect a small one in aid of their wind-mills;—consequently it had not a fair trial; and here the matter rested for many years. Mr. Glynn, however, at last accomplished what those great men had imagined; "and in so doing," says he, "I have not only caused 'two blades of grass to grow where but one grew before,' but I have had the pleasure to see abundant crops of wheat take the place of the sedge and the bulrush." The first steam-engines erected, we believe, were those near Spalding which drain Deeping Fen. There are two, of 80 and 60 horse power, in one building, put up in the years 1824-5. The quantity of land drained is 25,000 acres:—the following are some particulars as to these engines:—The scoop-wheel of the 80-horse is 28 feet in diameter, the float boards five feet wide. It was intended to "dip" five feet, but owing to the subsidence of the land there is seldom a dip of more than two feet nine inches. The water is lifted, on an average, seven feet high; and at the above dip,

lifts 160 tons per minute. When both engines are at work, the total weight of water raised is 300 tons per minute: the average annual consumption of coal is 1200 tons.

It is pleasing to watch the huge revolutions of this massive machinery, and to reflect that all this engine-work is agricultural, that these ponderous wheels are assisting to raise eatable produce from the soil, which shall furnish a population with food and comforts. Artificial works like these give an air of manufacturing industry to the labours of husbandry; impressing upon the mind the fact of farming being, in effect, the fabrication of bread and meat from raw materials by the toil and ingenuity of man.

From 1825 up to the present time, a great number of steam engines have been successively erected in almost all parts of the Great Level; being most frequent in the Southern division of the Bedford Level, and in the Witham Fens toward Lincoln. They have supplanted the ancient wind-mills in their respective districts; and are almost universally worked by vertical scoop-wheels, very few being fitted with pumps. The number of wind-mills formerly at work on the whole of the fens between Lincoln and Cambridge, probably exceeded 700; at present there may be about 50 mills in the Lincolnshire part of the Level, and perhaps 170 in the Bedford Level and adjacent fens; or a total of 220. The number of steam-engines may be estimated at 17 in the Lincolnshire part, varying from 10 to 80 horse-

power each, and upwards of 43 in the remainder of the Level. They lift the water from 6 to 16 or even 20 feet; and the area of land which they drain may be computed at not less than 222,000 acres. This rapid application of an unfailing though costly power to the performance of duties hitherto entrusted to the changeful and often disastrous caprices of the wind, is a striking example of agricultural progress; and when we think, in connection with this fact, of the drying of the great Whittlesey Mere, and of the Norfolk and Lincolnshire Estuary works now in course of construction, by which tens of thousands of acres of new country will be added, in spite of the present discouragements of the husbandman, to our national resources,—we feel that Agriculture, when taunted with the tardy slothfulness of her steps, may fearlessly point to these noble efforts, and in triumph proclaim them co-equal with the miracles of engineering and manufacture.

As we have given various items with regard to a scoop-wheel, the following are similar figures as to a pump-engine,—viz., that three miles from Wisbech, which drains the district of Waldersea. It was erected in 1832, is of 60 horse power, and by means of a pump six feet in diameter lifts about 63 tons of water per minute from 10 to 20 feet high, according to the state of the tide in the Nene. The cost of coal is about £150. per annum. The district contains about 6,500 acres; but several wind-engines are also used upon various farms when there is a heavy downfall.

A new era in steam-drainage, however, seems to dawn upon us; for Appold's Centrifugal Pump which has astonished the visitors of the Crystal Palace, performs a duty equal to 90 per cent. of the power employed; and its light disc running rapidly with but little friction will most probably supplant the scoop-wheel, which slowly revolves with many tons weight upon its axle. The first of Appold's Pumps applied to Fen drainage is, we believe, that in temporary use at the works of the South Holland Sluice; but a still larger one is now draining 3000 acres of Whittlesea Mere. The wheel 4½ feet in diameter, worked by a 25 horse power engine, lifts 74½ tons of water 5 feet high, or 101 tons per minute between 2 and 3 feet high.

It is difficult to make a comparison between the expenses of wind and steam-drainage; but when the uncertainty of the one and the security of the other are considered, the balance of advantage according to general experience is far in favour of the steam power.

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## OUTLINE THE FIFTEENTH.

## MODERN HUSBANDRY OF THE FENS.—A CONCLUSION.

Our "Fen Sketches" have successively represented the physical changes which were wrought in the formation of the Great Level, the great alternations of waste and fertility, prosperity and desolation, forming the history of its surface, and the labours effected by art and perseverance down to the enterprises yet incomplete; it remains, therefore, only to pourtray the actual condition of the Fen lands at the present day, and, if necessary, to etch roughly the indistinct forms of approaching but still remote improvements. However, as it is not our intention to present our readers with a regular *Report* on the present state of the Fens, a very few words will suffice on this head, and we shall quickly have to bid good night to those who may have been pleased, instructed, or annoyed by these records of our humble observations and researches.

We will begin with the northern fens. *East, West, and Wildmore Fens*, east of the river Witham and north of Boston, comprising about 40,000 acres, continued until the beginning of the present century in the wild condition described in a previous chapter. The drainage is now a natural one of great efficiency, by means of several large and navigable drains emptying into the Witham at and below Boston. The work was executed under the

superintendence of Mr. Rennie, in pursuance of an Act passed in 1801; and it was here that the principle of providing separate outlets for the lowland and hill waters was first carried into effect. The rapid waters of the upland becks are intercepted by catchwater drains surrounding the district, whilst the sluggish fen-water seeks the outfall through canals upon a lower level. The fields are now divided by neat whitethorn hedges, and the surface, both of clay, silty loam, and peat earth, is under a high state of cultivation. The farms are nearly all in tillage instead of pasture,—wheat, oats, beans, and barley, seeds, turnips, and coleseed yielding bulky and wealthy crops, for market, for grazing long-woollen sheep, and feeding large cattle. *Holland Fen*, of 22,000 acres extent, along the west bank of the Witham, is a well-farmed tract of good loamy land, producing every variety of cropping. The drainage is a natural one by the South Forty Foot drain. The *Witham Fens* of 25,000 acres running up to Lincoln, have received a steam drainage by a considerable number of engines since 1831. The peat soil has been suffering from bad management, but oil-cake yard manure and bone-dust are now raising from it good yields of grain and an abundance of green food. A method of wheat-sowing has been tried in these fens which keeps the land solid and unparched by the sun, and its moisture unabsttracted by the wind. By means of a drill, made with coulters like the tines of a scarifier, the corn is sown upon the coleseed stubbles

without ploughing, and thereby lightening the well-trodden and compressed soil. Immediately south of this tract are some smaller districts, for the most part imperfectly drained by wind-mills; and stretching further southward to the river Glen is a narrow reach of both black and loamy land,—the drainage principally by natural fall into the South Forty Foot, under the designation of the *Black Sluice Drainage*. *Deeping Fen*, about 25,000 acres, north of the river Welland, lying between Spalding and Market Deeping, has now a very good steam drainage with the exception of about 4000 acres in the lowest part, although the surface has subsided at least two feet in drying. The soil adjoining the western high lands is gravelly, near Spalding it is a fine dark-coloured loam; but the principal portion is peat, with a subsoil of good clay or silt which has been incorporated with it. It is nearly all arable,—the fallow crop coleseed, occasionally turnips; the corn crops wheat and oats, alternated with clover and seeds. Wild as was its former condition of wet grazing ground producing a rank coarse fodder, Deeping Fen has now acquired celebrity for its enterprising managers; and, generally speaking, the various artificial aids are plentifully employed in every department of feeding and manuring.

The *Bedford Level* is partitioned into the North, Middle, and South Levels; the first draining by the Nene, and the two latter by the Ouse. The management of the ridges of higher ground called the “high lands,” intersecting these levels in many

directions, differs from that of the flat fen land, because of the difference in the soils; the former consisting of stiff clay and in some parts sandy and gravelly land, the latter being chiefly peat earth. The *North Level* is included between the Welland and Morton's Leam, which runs from Peterborough towards Wisbech; and the whole, containing about 48,000 acres, enjoys a complete natural drainage. It was at first relieved from an artificial drainage with thirty windmills and one steam-engine by the Nene Outfall improvement and accessory works lowering the head of the water in the drains; and has been subsequently benefitted by the removal of obstructions in the same river channels. These consisted of bends, shallows, and the piers of Sutton Bridge, just supplanted by a structure of wider span offering but little hindrance to the outflow of the tide. Much of the old pasture has been broken up, and claying and under-draining have been extensively practised. Coleseed, oats, wheat, seeds, and beans cover most of the surface; neat well-constructed farmsteads are general; and agricultural improvements are being constantly introduced and extended through the district.

The *Middle Level*; containing about 150,000 acres, is the largest of the three divisions; extending between Morton's Leam and the Hundred Foot or New Bedford River, which conveys the Ouse waters directly across the fens. The drainage is chiefly by windmills, and therefore precarious in certain seasons; the number of mills is about 150. There are also

upwards of 10 public and private steam-engines, draining more than 40,000 acres; but it is expected that the outfall and internal works now in progress will furnish a large portion of the district with a natural drainage, and materially relieve the labours of the mills and steam-engines, besides having laid dry the bed of Whittlesey Mere—formerly a lake four miles in breadth. The surface is generally peat-earth, about two to five feet in depth, with good clay under it, forming a very productive soil. In some of the Huntingdonshire fens, however, the boggy soil is of much greater depth. Some parts consist of a gravelly clay; there is also a portion of silty land; and bordering the high lands, the peat is usually mixed with brown clay, the whole being generally of good quality.

The *South Level* stretching south of the Hundred Feet river, with an area of 120,000 acres, is almost entirely drained by steam-engines; which throw their water into the various main drains and natural rivers intersecting the low lands. There are about 20 engines, some of them very powerful; Littleport Fen, of 28,000 acres, having two of 80 horse power each. The greater portion of this level has a surface of moor resting upon clay; but this is not so commonly applied to the top soil as in other parts of the fens, as it often lies very deep, particularly in those districts but recently steam-drained. Adjacent to the Norfolk and Suffolk high lands, the subsoil is sand; the soil, in the absence of clay, being very weak and poor, though clay has in many instances

been carted upon it with excellent effect. In some localities, there is a mixture of clay and moor, and near the Cambridgeshire high lands, there is some loamy clay resting upon the peat. Other districts consist of strong fen land, mixed with brown clay, lying upon moor and gravel; these lands having been drowned for years by floods from the upland clays, which thus deposited a quantity of good warp upon them, forming strong useful land.

The system of husbandry formerly practised in the Middle and South Levels was that of paring and burning for coleseed, fed; taking two or three white crops, laying down to grass for several years, and then burning again. Perhaps it was necessary to combat one element with another, to apply fire to the land that was choked with water; but modern sagacity has made the fire assist the wind in drying the soil, instead of consuming it; and with good drainage and claying, a better mode of tillage has arisen. The rotations at present are somewhat as follows:—Coleseed, with bone-manure; Oats; Wheat; half Seeds, half Beans; Wheat:—or, Coleseed, with bones; Wheat; Oats; Wheat; Seeds; Wheat. The fallow crop is almost invariably coleseed, with a few roots on the higher grounds. The cole is a most valuable crop, producing on these vegetable and carbonaceous soils a great bulk of rich food for sheep; the stalks being thick and juicy and running up to two, three, or even four feet in height. It is fed off by Lincoln, Leicester, and half-bred sheep. Great numbers of cattle are

wintered in the farm-yards, being supplied with oil-cake to enrich the manure, at the rate of three to five lbs. per head daily; and the animals are sold out as stores to be fattened on the grazing lands. Bone-dust for the green crop is an important item in fen management; but there is one manure which is seldom or never seen on the low lands, but would doubtless be of great service, viz., lime. In a rich vegetable earth, abounding in carbon, it could not fail to promote fertility, and neutralize the acid substances which readily form in the peat and prove corrosive to the roots of plants. To apply a little lime would at any rate be wiser than ploughing in green crops for manure, as is frequently to be seen on this land; and as the fen wheats are liable to grow too rank and heavy, lime would undoubtedly save much corn from being storm-broken by its well-known property of shortening and strengthening the straw. The expense? Chalk hills are near, railways cross the fens in every direction from these hills, and canals and drains penetrate nearly every square mile of the country.

The black land is not difficult to work, but is peculiarly infested with twitch or couch-grass; great and incessant labour is required in eradicating its long matted fibres, which spread so deeply and rapidly in this light soil. The wire-worm revels here; and neither pressing with the roller, nor trampling with the flock, can give a sufficient solidity to the land to check its ravages. Field-mice, too, excavate their subterranean houses

and winter stores, with considerable mischief. Crosskill's clod-crusher has proved of incalculable benefit, by pressing in the young wheats, and rendering the soil firmer and more able to resist the injuries to which it is liable from wind and frost. In some localities of the Middle Level, both deep and subsoil ploughing have been practised on the fen land. This operation mingles the under-stratum of brown moor, or "turf," with the surface soil, forming, we believe, a beneficial change to the clayed land. And by increasing the depth of soil, it gradually gets rid of the fen-farmer's chief nuisance—the wet spongy subsoil of moor, which keeps his land wet and cold, soaks his manure into the ditches, and by reason of its irony and corrosive properties, is highly deleterious to the roots of his crops.

Along the three great rivers of the Bedford Level are "Washes," or wide spaces of ground extending in length across the whole breadth of the fens, left open to be overflowed whenever the streams are swelled by upland freshes. The Welland Wash contains about 1500 acres, Morton's Leam Wash between 3000 and 4000 acres, and the Hundred Feet Wash, (21 miles in length, and from one-fourth to three-fourths of a mile broad,) 5000 acres. These reservoirs are flooded every winter with from 3 to 7 feet of water; but are mown in summer, yielding large crops of coarse fodder, the eddish or aftermath being stocked with great numbers of young cattle.

North-east of the Middle Level, a breadth of peaty land stretches between Downham Market, Lynn, and Wisbech, partitioned into several small districts, which unitedly comprise about 15,600 acres. Some of these fens are still dependent upon the fickle power of wind for the safety of their cropping; but within a few years some of them have wisely and satisfactorily substituted the steam cylinder for the mill sail as the prime mover of their drainage machines. As an example of the value of good drainage and the application of clay, it may be stated that a tract of fen land near Downham, which, before the cutting of the Eau Brink Cut at Lynn, in 1821, was almost always under water, was offered for sale, for £1300, about thirty years since; it is now drained and well dressed with clay, and produces a clear rent of more than £1300. a year!

West of these fens and south of Wisbech, are some rich pastures, and fine arable land, that formerly produced hemp and flax in considerable quantities. Waldersea district, situated here, has a rich loamy and moor soil. Its drainage we have already referred to: it has the credit of being the first fen district that obtained an Act of Parliament for its drainage, viz., in the year 1606.

A few words must be added respecting the marsh districts lying between the fen, properly so-called, and the sea. In the district called Marshland, in Norfolk, extending between the Ouse and Nene outfalls,—in South Holland, in Lincolnshire, stretching between the Nene and Welland outfalls,—north-

ward of Spalding, and also north-east of Boston, there is a considerable tract of marine clay. In Marshland, this is chiefly arable land, producing large crops of wheat and beans, but in Lincolnshire it forms exceedingly fine grazing land. This tract lies inland of the old Roman bank. Outside this barrier are the proper marsh lands, where trees become fewer and houses less frequent. Here there is generally too much water in the drains in winter, but a scarcity in summer; so that the practice is to let in salt water through the sluices in the sea-banks whenever the ditches are dry,—this affording moisture to the soil and a fence for live stock. The surface soil is generally a brown loam, resting on a porous sandy silt; though the tidal currents deposited their slime in a very unequal manner,—in some places precipitating a mass of raw silt, in others floating the fine clayey particles into a bed of rich soil. Grain, pulse, and root crops, of nearly all kinds, are grown with large yield; and in some localities, mustard, woad, and chicory are very productive. Linseed oilcake is extensively employed for feeding yard cattle. Bones for the green crop are not often applied. Under-draining has been partially done with thorns and with tiles; but being necessarily on a dead level, with the ditch-water frequently overtopping them, the drains have not proved of that essential benefit felt upon sloping lands.

The Fen Farmer has made a great progress within the present century, which may well vie with the

improvements upon the bleak stony wastes of Norfolk and Lincolnshire. And his advance is at a quicker rate now than formerly; inasmuch as his method of wading upon high stilts through waterflags and cotton-grass has been abandoned for speedy driving upon turnpike roads and railways over sheep-fed and corn-clad fields. If you doubt the fact of his rapid and wonderful improvements, you need simply turn to one branch of husbandry,—compare in your own mind the antique *animals* of the past with the *neat* cattle and sheep of the present age. Contrast the hair and teeth of those thistle-fed horses with the strong teams of our day; the rough-boned ox with hide distended over sharp hip and wiry rib, with the gentler beast of modern breed; the large-headed, thick-legged, shaggy remnant of a half rotted flock, with the comely well-conditioned sheep now grazing on our dry meads, rich clovers, and luxuriant cole.

Extending our attention from the Great Level to the Kingdom generally, we may observe that British Husbandry in every district has greatly progressed of late years. For though Agriculture is constantly affirmed to be in his childhood, yet, as he has suddenly relinquished most of his clumsy implements, and from 8000 to 9000 portable steam-engines, with their accurate mechanism of band-wheels such as are marvels of delicateness in farm machinery, are at work throughout the country,—may he not be regarded now as no longer a mere child, but a forward and strutting young urchin that has learned

both to smoke and wear straps? It makes us joyful to think of the great stride we have made in fifty years; and if this has been done under unfavourable conditions, such as want of peace, want of intercommunication, want of knowledge, how rapidly may we not expect to run in these days of railroads, cheap literature, agricultural societies, farm laboratories, Crosskill castings, steam flails, &c.? And if farming went a-head under a lazy Protection,—when if it fed on bigger prices it had to lay out more for them,—shall it not fly over the turf under the pricking goad of Competition,—when if prices are lower there are assuredly many more ways of obtaining them? Whether or not we shall be able to “exist” (among game preserves,) and “live” (on champagne and the four-course system at dinner,) for many more years under the “obnoxious and suicidal policy” (which contents the majority and increases the Revenue,)—the most unflinching Protectionist among us will acknowledge that Free Trade makes us “farm better” at present. But we must beware; or we shall be *accused* of holding “*liberal*” opinions, and of insinuating them beneath the “clap-trap” guise of recommendations for agricultural improvements, by those persons who can see no possible cause of “distress” except the removal of a duty that rendered food scarcer in the country, who cannot see that the public buy nothing but what they can pay for, and that therefore an increasing consumption is a sign of prosperity,—who cannot believe it possible for rent, tithes, taxes,

and the cost of all the farmer buys to be reduced enough to repay him for the absence of an eight shilling per quarter duty on his cereal produce.

We will not close our labours, however, without referring to such topics. Our volume is an agricultural history; and as we have related some popular struggles for rights against appropriating gentry, we deem it fitting to touch upon the question of "rich and poor" in reference to the present and future.

By the unexampled improvements which have taken place in Fen-farming in consequence of Drainage and Inclosure, proprietors have been enriched, tenant-farmers have prospered, and labourers have found extended employment as fast as their numbers increased. But we regret to say that while we can point to numerous examples of landlords made wealthy, and tithe-owners rolling in the luxury of opulence now poured into their treasury for every two mites which they used to receive, and even to farmers who have found fortunes upon their fields previously hidden by the waters,—we cannot affirm that the poor are abundantly better off since the inclosure of commons, and that they have obtained a proportionate share of the new fruits, to the raising of which they so largely contributed by their toil. Instead of their *individual incomes* having increased, we believe that, in comparison with the price of food, their main necessary, wages are no higher than they ever were. But supposing that by cheaper clothing, and the thousand advantages which improved manners and customs have made general,

the labouring classes are somewhat better off than they formerly were; are they not more dependent upon masters than they were? And the slave is not reconciled to his fate because his driver finds that a man, like a horse, works best upon good keep. When their common-rights, for the defence of which they so manfully struggled, were absorbed into the hands of large occupiers, was not their independence lost, and their private property diminished and taken away? Are they much advantaged by having to pay exorbitant rents for houses, and by being driven by proprietors unwilling to augment the poor's-rate, to crowded freehold villages many miles from their place of labour,—instead of inhabiting even mud cottages close by their own plot of ground, and the farm where they worked, and feeding not merely a pig or two at a time, but also having a cow pastured upon the common? Does the present price of coals recompense them for the lost privilege of digging turf-fuel? Is the labourer's present life, with the fear of the Union-house as the final reward of his toil, and without the hope of leaving to his children any better lot, so vastly preferable to what the fishing, bird-catching, free but often hard living of the poorer fenmen once was?

We know that population has increased, so that a new mode of agriculture has been necessary to feed the multiplying mouths; fishing and fowling would not suffice now as it did once; but why should the change bring individual gain only to certain classes? Why should not the poor have progressed in per-

sonal comforts as much as those who have been enriched in too many instances by merely owning land which became improved; those who have manipulated the improvements, as much as those who devised them; the hard-working many, as much as the more fortunate few? A similar state of things is found upon the Wolds and Heath of Lincolnshire, and probably in any district of England where great improvements have been made. And this, we think, seems to betoken the existence of some inequality in our laws. We cannot suppose that the labouring poor are destined by Providence to be the only non-progressive, or even the disproportionately least progressive class; and must infer from the existence of so much destitution in the midst of so much luxury,—when the poor are guilty of no more idleness, unthriftiness, and crime than the rich,—that some one or more of the upper classes of society are favoured and inequitably privileged by the present laws and institutions of government. And there appears more probability in this suspicion, when we consider, that those classes have had the making of those laws and the moulding of those institutions; everybody being aware that most men do better for themselves than for others.

The Oxford "Chronological Tables," published in 1839, contain this statement,—"In England, in 1786, there were 250,000 landed proprietors, and in 1822 only 20,000—the church and corporations have each about 6,000 proprietors; and, including these, *the whole land of fourteen millions of in-*

*habitants is in the hands of some thirty thousand individuals, let out to farmers and leaseholders.* The great landed proprietors are about 400; among these the Duke of Northumberland alone possesses a rental of 100 to 120 thousand pounds a year—he and twenty others of the English aristocracy, have an annual income of about £1,680,000., giving an average of £80,000. each." In connexion with this, we may mention another fact; in the year 1850, the pauperism of England and Wales amounted to 1,033,842 persons, comprising a considerable nation, larger than all Scotland at a time within the memory of some now living; nearly six millions sterling were consumed in their support. While not more than one in 500 owned a plot of land, every *sixteenth* person in England was a pauper! Now, when we look at such an unequal state of things, we cannot but soften our impatience toward those who declare it as their belief that this is not a distribution of property effected simply by the workings of supply and demand in the great market of society; that the exclusive few have obtained and still keep their wealth and lands by the power of laws and of privilege, not simply by unexampled industry and perseverance; that the enormous resources of this kingdom are equal to the task of supplying the whole population with food and comforts, and would also annihilate the pauper burden if a greater number of skilful and thrifty agriculturists and other classes could invest their earnings in a share of the soil,—if the attainment of some area

of land could be made the reward of honest farm-industry.

Some readers may denounce these remarks as tending toward "Socialism;" some may object to our advocating in a Fen history political nostrums and democratic disturbances. But "politics" are no longer confined to Whig and Tory parties,—they have become well-nigh life-and-death matters to the community. *All parties* are willing and anxious for great political changes; the only question is, what are those changes to be? Farmers are loudly saying,—“These are not times in which to hold our tongues. Protection is gone: if we again obtain it, we may perhaps struggle on for a time as we have hitherto done; but if we fail in our endeavour to restore “paying prices,” (which is certainly possible,) what course shall we have to pursue? It will be an impossibility to continue as we are: if our crops were always first-rate we cannot, according to trustworthy estimate, get a remunerative profit; and when we consider how often we lose large patches of cropping from blight, and other causes, it is evident that our circumstances must be altered in some way or other in order for us to meet the requirements of the case. Great advances in our mode of husbandry are not capable of assisting us all for a long time, because they are so slow, and we have not all got skill or money enough to carry them on. *As we have been injured by a political injustice, we must claim to be compensated by a political relief.* When slavery was abolished, the planters

received twenty millions of pounds ; when the brick duties were removed, the makers were accommodated so that they should lose nothing by their stock in hand ; but when the agricultural interest lost its protective duties it received no compensation and but little accommodation. We do not say who are to blame for this ; but we say that, of course, we cannot, will not *starve* if any means can be found by which we may live. Our labourers are dissatisfied ; and as we and not they possess the franchise, they depend upon us for the political changes which can relieve them. We are all in distress in a land of wealth ; and demand that a remedy be found somewhere." So speak the farmers : what then is to be done ? A distinguished farmer in Essex, and a protectionist, has calculated that there the loss is three shillings and ninepence an acre instead of a profit of ten per cent. upon all the tenants' capital laid out. The rent is put at 27s. : but it is not reason that a tenant should pay such a sum to another man, besides treating him with all courtesy, for the privilege of being allowed to lose 3s. 9d. It will have to be reduced. But how ? If one man leaves such a farm there are plenty ready to take it. Yes ; but pass a law that shall make the landlord take his chance with other creditors, and he will then be careful not to let his land to a man without money, whereas now, whether the tenant has little or much, the owner is sure to get the rent. And depend upon it, though there may be many men anxious to be getting a living of

some sort, although it may be only while they are running up bills with tradesmen under credit of having been let a large farm by the great landlord of their neighbourhood, there are very few men with capital who are prepared to lose it or in any way invest it without a profit of some kind. Another law might enact that all restrictions upon the free transfer of land should be removed, so that no land could be kept out of the market by entail or what what else you please to call it, and so that the expense of conveying should be trifling instead of exorbitant; and thus there would no longer be an undue competition for land,—as there is now so much cannot be purchased, and if purchased, not reasonably,—and buyers, not having to give so much money, could then afford to take less rent. Then again, by another new law, the tithes might be appropriated to their ancient uses, viz., supporting the clergy, repairing the churches, and maintaining paupers, for the great families who received the church property at the dissolution of the Monasteries, gradually shirked the duty of feeding the needy, &c., under which terms they obtained it, and from which obligation *they were never legally released*: they got all for themselves, and saddled the paupers and the buildings upon the backs of the community. But if it be said these were not their ancient uses, at any rate they would be very good ones, and there is no reason why we should not so divide them *rather than ourselves starve*; thus we should get rid of poor-rates and church-rates. In the estimate men-

tioned above,—the tithe is put at 7s. 6d. an acre,—poor's-rates at 3s.: if then the rent were reduced from 27s. to 17s. or 18s., and the 3s. were to be paid out of the 7s. 6d., the farmer, we find, would no longer be losing 3s. 9d. per acre, but would gain a profit upon the capital he employed. If then, we say, the agricultural interest should fail in the coming trial for a restoration of prohibitive duties, here are means which will (according to the above calculation,) amply satisfy, at least the Essex farmers. But what an injustice to the landlords! “Never mind,” tenant-farmers ought to say, “we who are *working* for a livelihood cannot starve by the annual loss of 3s. 9d. per acre;—besides, *Landlords voted away our protection and reduced us to this dilemma*. What an injustice to the parsons! Can't be helped; they have received the nation's money for teaching for ages what not half the nation believed in, and in a manner that very few of the nation approved of,—they have swallowed at the least six million pounds a year, of which they have upon the whole made a scandalous use, scurvily treating their real labourers upon short fare, and pampering their idlers upon immense feasts of riches,—some of them pocketing to the tune of £5,000., £10,000. or £20,000 a year each. Think of the latter sum; why the Bishop of London, with more than that, must beat many a first-rate merchant *without any trouble*,—get more than two plums in ten years. If it really would be an injustice to these good but extravagant people to make them live a little more after the

fashion that they ought to follow, as humble professors of the Christian religion, viz., one of love and *self-sacrifice*,—seeing that we have supported them so long by our efforts at raising extra tithe pigs and by our strenuous labours to get extra large shocks of corn for ourselves and them, we really shall not feel so very squeamish about committing this ‘wicked and unprovoked injustice’ rather than starve.” Here then we have just touched upon one or two of the many measures of relief required by the farmer.

Respecting reduction of Taxation, economy of County expenditure, &c., we say nothing,—only reminding our readers that almost the whole of the expenses of central and local government when traced to their ultimate outlay, are spent in the purchase of food, clothing, &c.; so that all civil, military, and other expences at home, ought to be lower when the price of food is lower, and thus taxation ought to be considerably reduced—even without lessening the numbers and reforming the salaries of officials and *officers*.

Some people are for getting Protection again; notwithstanding that others ask, “how can it be better for the country to have less to eat? for you cannot possibly raise the price of food without lessening the quantity of it.”

Some are for extending scientific farming and high management, and leaving politics alone; notwithstanding that others say, “the farmers as a class have neither capital nor skill to carry out great

improvements in their present practice *immediately* and *universally*; and the remedy, whatever it ~~may~~ be, must come *at once* or be too late."

From what we have said, however, it appears that if these proposals should prove illusory, there are still other means left by which farmers may live at their business.

Readers, farewell;—we think that in our sketching we have at last *drawn a conclusion*.



